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Table of Contents.

ORIGINAL ARTICLES— Page.

What is Pathology?, by E. S. J. King 765
Hexamethonium Bromide and Kidney Function, by E. G. McQueen, M.B., M.R.C.P., M.R.A.C.P., and Elinor Trewin, B.Sc. 769
Medical Education, by V. D. Plueckhahn 771
Treatment of Rheumatoid and Osteoathritis by Sodium Para-Aminosalicylate with Pesentation of Cases, by Michel Brous 774
The Shoulder-Hand Syndrome, by James H. Young, M.D., F.R.A.C.P., and A. T. Pearson M.B., B.S. 776

REPORTS OF CASES—

Acquired Melanosis: A Grave Warning by V. J. Kinsella 780
A Case of Brucellosis with Acute Porphyria, by Joan Paton, Suzanne Mander, Rober Sheppard and Geoffrey Ey 781
Congenital Cystic Dilatation of the Common Bile Duct, by A. L. Newson, F.R.C.S., F.R.A.C.S. .. 784

REVIEWS—

Wartime Wounds of the Extremities 785
"Patterns of Marriage" 786

BOOKS RECEIVED 786

LEADING ARTICLES—

A Report on Medical Education 787

CURRENT COMMENT—

Chemotherapy of Tuberculosis 789
Bejel 790
Acute Traumatic and Toxic Renal Failure 790
Pernicious Anæmia and Polycythæmia Occurring in the Same Patient 791

ABSTRACTS FROM MEDICAL LITERATURE—

Ophthalmology 792
Oto-Rhino-Laryngology 793

SPECIAL ARTICLES FOR THE CLINICIAN— Page.

XXIII. Observation of Abdominal Pain in Childhood 794

OUT OF THE PAST 795

CORRESPONDENCE—

Children and Accidental Poisoning 795
Human Bite Infection 795
The Injured Coccyx 796
Barotrauma 796
The Antibody Titre in Maternal and Infant's Serum as an Indication for Treatment in Hæmolytic Disease of the Newborn 796
Case of Carbon Monoxide Poisoning Treated by Replacement Blood Transfusion 797

UNIVERSITY INTELLIGENCE—

John Irvine Hunter Memorial Oration 797

MEDICAL PRACTICE—

The Use of Antibiotics 798

POST-GRADUATE WORK—

The Post-Graduate Committee in Medicine in the University of Sydney 799
The Melbourne Permanent Post-Graduate Committee 799

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA 799

CORRIGENDUM 800

OBITUARY—

Harold Vernon Foxton 800
William Allen Hunter 800

MEDICAL APPOINTMENTS 800

NOMINATIONS AND ELECTIONS 800

DIARY FOR THE MONTH 800

MEDICAL APPOINTMENTS: IMPORTANT NOTICE .. 800

EDITORIAL NOTICES 800

WHAT IS PATHOLOGY?[1]

By E. S. J. KING,

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> But when we hear words on the level of ideas and generalizations, we cheer loudly, we grow angry, we storm the barricades—and often we do not know what the other man is saying.
>
> STUART CHASE, *The Tyranny of Words.*

THE purpose of the discussion this evening is to consider what is meant when we speak of pathology, what, in a general way, pathologists are attempting to do, and finally, what we are doing here particularly in the Department of Pathology, with some reference to what we hope to do in the next few years. Some of this may seem to be self-evident, but I think it can be shown that some of our ideas do need clarification and that therefore a general statement is justified.

First of all we should consider what we mean by pathology. We know that different people view things from different angles, with the result that they may see only one part of them, and though we might not necessarily expect it, and I should say that I did not expect it to the degree that I have found, it applies very strongly in our own subject. In some cases quite strong opinions have been expressed and in others implied regarding the relative importance of different sections, and it has been very interesting to see how a trained person with special interests may be quite unable to comprehend a point of view, albeit different from his own, in a related part of his own subject. This is of course understandable when we appreciate that "popular opinions, on subjects not palpable to sense, are often true, but seldom or never the whole truth".[1]

This brings us to the general problem of communications between individuals. If when we are referring to a subject we really mean only one or other part of it, then people interested in different components will necessarily fail to comprehend each other.

> "When *I* use a word", Humpty Dumpty said in rather a scornful tone, "it means just what I choose it to mean—neither more nor less."
>
> "The question is", said Alice, "whether you *can* make words mean so many different things."
>
> "The question is", said Humpty Dumpty, "which is to be Master—that's all."[2]

Whether we can be the master of words or not is more than problematical, but we cannot afford, in a modern world, to attempt to be parochial and prejudiced about this if we expect to be understood by our colleagues. It is perhaps worth while, therefore, to go to a common and recognized authority on the meaning of words—the Oxford Dictionary.

The first thing that we find, of course, is that the word, like most of those in the language, may be used in several ways. The first of these is by far the most important and more commonly employed.

Pathology is: "The science or study of disease; that department of medical science, or of physiology, which

[1] Read at a meeting of the Section of Clinical Pathology of the Victorian Branch of the British Medical Association on April 18, 1952.

treats of the causes and nature of diseases, or abnormal bodily affections or conditions." There are two subsidiary meanings: a transferred sense—"The sum of morbid processes or conditions", and it may be "Extended to the study of morbid or abnormal, mental or moral conditions". The second (but rare) main sense is "The study of the passions or emotions".

The first meaning deserves particular study. Here we see that attention is directed especially to physiology and this is in conformity with modern views of what pathology really means. There are two points of interest here. One wonders whether perhaps by implication, since physiology is given as an alternative to medical science, it is intended to convey that perhaps physiology is not scientific, but (in serious vein) the important point is the clear emphasis that pathology deals with function. It is only when we come to the subsidiary definitions that we find that pathology is "the sum of morbid processes".

It should be said here that the third idea, of the study of abnormal mental conditions, is of great importance. It is apparent that this is becoming of greater significance every day and is being linked with the more concrete studies of physiology and morbid anatomy by the rapidly increasing body of information regarding the influence of the nervous system on the rest of the organism—by way of the subthalamic region, which in its turn affects the pituitary gland, this in turn influencing any of the other ductless glands and, through those, the various tissues. This is a subject worthy of discussion by itself, but is mentioned here to support the appropriateness and applicability of this particular part of the definition to our more immediate interests.

The second main division—the study of the emotions—is less frequently referred to now than it used to be, and in the dictionary is recognized as being a rare application of the term. However, we need only to consider the tremendous advances that have been made recently in the study of the suprarenal gland, and consider this in relation to what we know of the secretion of adrenaline in emotional states, such as rage, to realize that this will probably come back into its own in due course. However, we do not need to consider it further here.

If we might continue this line of approach for a little longer we will see that we use the term "disease". On recourse to our dictionary we find that there are several definitions of disease. In the first place there are various obsolete forms, such as: absence of ease, discomfort, disquiet, *et cetera*. The more common usage is that it is "a condition of the body, or of some part or organ of the body, in which its functions are disturbed or deranged; a morbid physical condition; 'a departure from the state of health, especially when caused by structural change', also applied to a disordered condition in plants".

The points to be considered here are, I think, that first of all there is primarily the idea of disturbance of function and that only secondly do we have the consideration of physical change. It should be pointed out that the emphasis on the physical features, for example, as "when caused by structural change", was given by the Sydenham Society in its "Lexicon of Medicine and Allied Sciences" at the end of the last century. We should remember that this was a time when most emphasis was placed on alterations in structure.

It is important to appreciate that the general proposition applies to all living structures, animals and (*pace* the botanists who would be amazed that we dismiss a vast field in two words) even plants.

Another word that we use commonly and light-heartedly is "abnormal". When we refer again to our dictionary we find that: "Few words show such a series of pseudo-etymological perversions" which may easily indicate or even reflect some of the possible variations in meaning. However, it is generally regarded as being what is "deviating from the ordinary rule or type; contrary to rule or system; irregular, unusual, aberrant".

When we consider all these and the variations that may occur in other terms that we use, we can see that we cover a very wide field and thus at any time if we wish to convey a definite meaning it is necessary to be precise. We may find indeed, a a result of this breadth of scope, that "As many heads, as many wits there been".[3] There is the morbid anatomist, the hæmatologist, the clinical pathologist, the experimeter in various forms, each of whom is a pathologist. I is not necessary, however, that our attempt at precision sbuld involve such rigidity that we are unable to see more than our own small part of the subject. Indeed we might say

> Strnge! all this difference should be
> 'Twxt Tweedledum and Tweedledee.[4]

We shall retun to this problem, but first of all it would be wise to consier in some greater detail the various parts of pathology s they are studied and taught by us.

The Scope of Pathology.

Of the varias viewpoints regarding our subject probably the two outsanding—as they are in most other departments—are tb theoretical or "academic" on the one hand and the "pratical" on the other. It does not help very much to say that the practical of today is the academic of yesterday. The important point is that they are likely to have only , small area of contact, and I personally feel strongly that it is desirable and indeed essential that the association o the two should be as close as possible. However, to take things as they are, we find that there is a very great lifference of opinion regarding their relative worth. Even amongst the academicians there are the two points of viev whether teaching or research is the more important; and one even sometimes finds the discussion developing abng the lines of whether, in a given set of circumstances one cannot be excluded. I would emphasize here what has been stated by many before this, that the best teaching is carried out in departments where research is performed and also that the best research will be achieved in places where some teaching is done.

Thus, in taking to people, I have found that one individual will regard pathology as that study which is presented to students, undergraduate or post-graduate, in the form of lectures and demonstrations and thus, in general, can be regarded as the presentation of the general problems of the subject. Another person thinks only in terms of the clinical pathologist, and so on.

For the most part, despite our definitions given above, pathology is regarded still as a study of morphology. We find, for example, that if we go to a hospital there are various sub-departments in the department of pathology, and if we ask for the pathologist we are, as likely as not, referred to the morbid anatomist. I gather that in some parts of the world the specialization is to such a degree that the individual who does autopsy examinations may be a different person from the one who examines the biopsy material. This does not happen in this city, but several parts of the work are usually collected together under the title of clinical pathology and with such emphasis as to suggest that it is in some way peculiar and different from ordinary pathology.

When we return to a department of pathology, for example, at a university, we find that there is likely to be a separate place for experimental work, as if this again were something that was quite independent of and different from, if not actually alien to, ordinary observational work.

There is no doubt that the special techniques of chemistry and physics are likely to make the investigation of phenomena from the biochemical and especially from the cytochemical point of view difficult to encompass, and, as far as ultra-microscopic physics is concerned, there is no question but that specially trained physicists are required. And yet if we consider the way in which knowledge is progressing at the moment it is obvious that these must begin to be, even if they are not already, included in our armamentarium. At the least, they must make some point of contact—even though this may be for a time only small—with the more mundane methods of attack on the subject.

Information obtained from the examination of other living tissues, both animals and plants, has been applied in many ways for centuries. And this has applied to a

very great degree in the last few decades. Nevertheless, the study of abnormal conditions in animals has been segregated largely from the similar study in human beings and, indeed, plant pathology is often regarded as being a completely independent subject. That there must be some independence goes without saying, but what is emphasized here is that there are many points of contact and a clear appreciation of these can be helpful to the students only on either side of the presumptive boundary line.

Applications of Principles in General.

We as pathologists have three principal tasks. First there is teaching on each of a number of different planes; secondly there is research work of many different kinds; and finally we are responsible for undertaking and making adequate provision for a very large amount of routine work of a technical nature.

Teaching may be regarded in several ways. We know that "He who can, does. He who cannot, teaches".[5] This, of course, can be answered in a number of ways, but we will not tarry here over a point that does not really require serious attention. I would say, indeed, that it is important that the teacher should be one who is doing actual work in his subject and, therefore, that any teaching institution worth its salt will be doing some amount of research work. There can be no doubt that we cannot possibly progress without our teachers, and it should be the ambition of all these to be able to say with Wolsey: "And, when I am forgotten . . . say, I taught thee."[6]

Our first function is to produce medical graduates because not only are these, in a well-trained form, an integral part of our community, but also they themselves provide various other groups of more specially trained individuals. The amount that the student has to learn now is greater than it used to be and is daily becoming greater, and only if, in my view, good original work is being done in the teaching department and it is possible for the students to see some of the most recent work with their own eyes will they be able to encompass the field adequately. Do not think that I am suggesting that the curriculum should be increased or expanded. It is proposed merely that it should be possible for the students to see some of the things about which ordinarily they are only told. Of course it goes without saying that a great deal of the pathology that they must learn must be taught at the hospitals, and here it is essential that the hospital teaching be integrated with that at the university.

Specialists of various kinds—physicians, surgeons, and members of other more limited, but because of this possibly more extensively developed, specialties—should obtain a considerable degree of fundamental training in pathology. For this reason it is desirable that some of the younger members of the profession should have appointments of some kind during their formative years (and incidentally during the period when they are able to give time to such work) in a department of pathology. In this regard we have been fortunate in this school.

The provision of pathologists for routine positions is very important and one which is becoming of extreme urgency in this city. These can be trained largely in the various hospital departments, but I would emphasize here that at least some part of their training should be carried out in a department of pathology where facilities are available and points of view are examined and discussed in a way not possible in a busy routine department. You will notice that nothing has been said of special studies such as hæmatology, parasitology, cytology ("surface biopsy", examination of smears and exudates and washings), amongst others; this is principally because these are more easily dealt with in hospital departments where routine work is carried out in greater quantity than in a university department.

The provision of pathologists on the academic level of course is obviously an important function and one which has been seriously neglected in this country. The problems in general are quite clear and do not need to be specially stated, but there is one point that should be strongly emphasized; that is, that any pathologist, particularly if he is going to undertake academic work, should during the first few years of his training maintain, in some form, a connexion with clinical work so that he is able to correlate adequately his pathological knowledge with the problems that are certain to be presented to him many times during his life. I have no doubt that the most important reason why clinicians are somewhat inclined to regard the pathologist as being little more than a laboratory technician is because at times the pathologist is unable to rise to the occasion in a manner clearly demanded of him; and this is due to his lack of appreciation of the clinical aspects of a problem.

Lastly, we have the provision of research workers in several fields. From my own observation I would say that the most serious hiatus to be observed amongst the more experienced research workers is that, though they have remarkably extensive and deep knowledge in some or other particular section, they do not have a clear appreciation of the problems of pathology itself—even though, of course, all their own problems are in the pathological field. Furthermore, at present there is no easy way in which they can obtain such training and it is incumbent on us to provide something of its kind.

In addition to this, the provision of technicians for teaching and research departments, for institutes and for all those rapidly accumulating laboratories attached to hospitals, is an increasingly urgent matter which must be faced soon and, indeed, should be faced now. Such training may be achieved in a number of different ways. It is clear that different methods and organizations must be integrated and it is a matter that we must consider most seriously.

Research may be carried out on different planes and it may be, and indeed usually is, possible to do this only in one or two departments of study. However, I feel myself that the more kinds that can be dealt with in any one place (given the proviso, of course, that the standard of work in each is adequate), the better it will be for all, because discussions between individuals, working in different divisions but on the same kind of problems, have been shown to be in many cases which could be quoted extremely valuable and generally productive of good.

Simple observational investigation into morbid anatomy is one which has been looked on askance for many years now. The pendulum has swung away to the experimental type of study. However, this is a good example of the "well reaped field" which has so many times in our history proved to contain most valuable gleanings. "We are as much gainers by finding a new property in the old earth as by acquiring a new planet".[7]

A very important part of such study, whether it be of gross appearances or of histological structure, is its correlation with clinical findings. It is this that makes the subject live; and studies of dead tissues themselves, if independent of other investigations, justify the quip regarding "dead meat". A review of much of the work of this kind shows that it falls into two departments—the observations which are made by clinicians and those made by pathologists. Seldom are these adequately correlated. It is only necessary to appreciate that the specimen that a pathologist receives is usually chemically fixed and contracted and in any case the cutting of tissues at operation has disorganized fascial planes and the like, so that unless places in the specimen have been specially marked by sutures even the surgeon would be unable to find them with certainty. For the best results such work should all be carried out by the one individual. This was well exemplified to my mind in a recent paper in which it was pointed out that adequate investigation of the method of spread of a tumour, in certain circumstances, could not really be made because lymph nodes could not be found in the region. Obviously the pathologist can find lymph nodes where present, but when these are not present he is unable to orientate the tissues accurately. For this reason I feel that the most satisfactory work of this kind can be done by young clinicians who are yet not so busy as to be fully occupied with their clinical work and are therefore able to carry out investigations and continue into the laboratory the observations that they make on the patient and in the operating theatre.

This correlation of clinical observations with examination of biopsy material (histologically, bacteriologically and biochemically) is one of the most valuable contributions, the possibilities of which are by no means yet exhausted. We all know what magnificent histological material such specimens, if appropriately treated, can provide. It is important to appreciate that the person doing this kind of work must accept hardships which the ordinary laboratory worker may not have to contend with. Years ago, when I was doing investigations on the Golgi apparatus, material was often available late in the afternoon or in the evening—which meant, of course, that it was necessary to stay up all night with it or be awakened by alarm in order to ensure that fixation and the like were carried out only for the recognized optimum time. This was before the Histokine era. The satisfaction derived from the results obtained was adequate reward.

Comparative pathology is only beginning to receive the recognition that it deserves; you will have noticed that a Chair of Comparative Pathology has been formed recently at Belfast. In general it is true to say that veterinary pathology has been kept quite separate from the study of human pathology and indeed has been regarded as merely an adjunct to a course such as that for a degree in veterinary science. The importance of the association of human and animal pathology is well shown particularly in the case of many of the parasites, of which the *Tænia echinococcus* is probably the most important.

These are important to us because they occur in human beings. However, there are many conditions occurring in animals which deserve consideration in their own right because of their bearing on the general principles of pathology and, since it is difficult not to retain some anthropocentric bias, in many cases study of these will give valuable information to investigators in contiguous fields. Recently I was shown an example of gas cysts of the intestine and found that only a small number of cases had been observed in human beings and that the ætiology and indeed some aspects of the morbid anatomy and histology themselves were obscure. When I referred the matter to some veterinary friends of mine I found that the condition was well known in pigs and furthermore that it was possible, under experimental conditions, to produce the disease at will. Here was a clear example of the immediate value to be obtained by a broader approach than we usually apply to the problem. Another condition that has been receiving attention recently is that of adenomatosis of the lung, and here again it is a matter of interest that this is one of the commonest "tumours" that the veterinary pathologist is likely to encounter. Still other examples can be given, but it is unnecessary here to labour the point that a study of pathology from the comparative point of view is of inestimable value.

Experimental work may be done in many ways: the injection of vessels in various circumstances, the injection of various natural passages, innumerable operations of various kinds, including removal of organs or part of them, their transplantation and the like. The use of innumerable chemicals ranging from various types of poisons up to carcinogens or hormones and the application of physical agents, from mechanical injury up to such as X rays, may all be employed. The attraction of this approach is that it is possible to make repeated and also much more precise observations and to control numerous factors which, in the present state of our knowledge, are uncontrollable or where this is not economically possible in the naturally occurring clinical cases.

At the same time it is important to realize that this is not the heaven-sent answer to all problems and that in itself it possesses certain disabilities.

> Like following life thro' creatures you dissect
> You lose it in the moment you detect.[9]

The importance of the experimental approach these days does not require any emphasis and incidentally I would regard a most important facet of it to be that it should be undertaken in some form in all teaching institutions.

The advances of the last few decades in chemistry and in physics are being applied to pathological problems as they have to other aspects of medical sciences. As far as we are concerned there are problems of wide range. They begin with the relatively simple ones of the application of chemical knowledge to cytological studies in the form of the application of more and increasingly complicated staining methods. The more recent studies of mitochondria and the enzyme systems of cells provide an increasingly fruitful field. This brings us of course to the matter of ultramicroscopic physics. The electron microscope has been applied to so many things that it is now, within the foreseeable future, an essential piece of apparatus for any progressive research laboratory.

Any and all of these various aspects could be elaborated to justify more than one evening's discussion and there are still others that have not been mentioned or have only been suggested by implication. All of these will have to be left for future discussion.

Applications of Principles to Local Conditions.

Here it is not proposed to discuss the problem from the point of view of the application of the principles to general conditions in this State, but rather to apply them specifically to the Department of Pathology in the University of Melbourne.

As you know, the teaching side of the department has developed well over the last few years. There are full-time members of the staff who illustrate the principle, that I mentioned earlier, of the pathologist obtaining some clinical knowledge by being attached to some hospital unit, usually an out-patient department. This does not involve a great deal of time and in my view the time spent in this way, within well-defined limits, is thoroughly justified.

The undergraduate teaching is probably more or less comparable with that given in other universities, and here we are fortunate in having a close integration with the hospitals. For example, although the university has not a direct or immediate contiguity with any hospital, the association is so close that each year there are, for example, more than two hundred post-mortem examinations carried out by officers of the department directly for teaching purposes in the various hospitals. From this and from other sources adequate current material is obtained for undergraduate teaching.

There is an adequate museum, which is being modified and added to continuously, and a special section of histopathology is in the course of preparation for senior students and post-graduates.

We are developing a section of neuropathology and eye pathology, and similar developments are in mind. A section of comparative pathology is to be developed, but, although begun, its adequate development can be achieved only when a suitable officer is obtained.

On the research side the department is being developed on the basis of pathology being accepted by the Faculty of Science as a science subject. I should like to say here that I am deeply indebted to Professor H. R. Dean, Professor of Pathology at the University of Cambridge, for very great assistance and advice in the preparation of our course. This will enable students, both of medicine and of science, to obtain a degree in science, majoring in pathology. This will provide us with research workers who will have had an adequate basic training in this subject. Various developments related to this and to the various forms of research generally need not be discussed in detail at the moment.

It is probably unnecessary to say anything to you of what has been done in the department in the last little while. There are several active workers in the department and you will be hearing from them within the next few months. We have been making what I regard as original observations on such things as pilonidal sinus, some diseases of synovial membrane and some aspects of coronary disease. Work is being done at the moment on pigmented basal-cell carcinomata, of which you will hear something this evening, and a group of other diseases. On

the experimental side we are collecting some interesting material on the blood supply of the thyroid gland and also on the innervation of tumours which have been induced by chemical carcinogens.

From the point of view of cyto-chemistry, we have the freeze-dry apparatus in action, and some useful observations are being made on material prepared by this means. A comprehensive research into hydatid disease from the point of view of its ecology as well as general and comparative pathology is being carried out; but I do not wish to weary you here with a catalogue of our activities present and prospective.

The point that I have wished to make is that the term "pathology" employed in the manner in which I think it should be used applies to a great many, even though of course related, aspects of the study of disease. It has both academic and practical implications. It involves both morphology and physiology, including biochemistry. It deals with matters not only on the macroscopic but also on the ultramicroscopic plane. It is a matter of both simple and direct observation, but also experiment. Incidentally, the modern habit of describing all experimental work as experimental physiology or experimental medicine is to my mind thoroughly unjustified. It also includes comparative pathology and, if knowledge progresses in the way in which it seems to be doing at the moment, plant pathology will become more and more important to us.

> "That's a great deal to make one word mean", Alice said in a thoughtful tone.[2]

At the same time, in my own view, the word should mean all this. A great deal has been said by various people in many places about the disadvantages and dangers of over-specialization. Here is one way in which we can overcome this danger. We must have our specialists and, as knowledge progresses, the specialization must become greater; but a great deal of the troubles arising from this will disappear if the various specialists are in sufficiently close association with each other to meet and exchange views frequently and easily. This can be done best when as many as possible of these are working as units in one department.

And finally, I should like to emphasize once more the point that I mentioned earlier in the evening, that the most efficient teaching will be done if it is possible for students of whatever level, undergraduate or post-graduate, to see going on actual research work which is related to the particular subjects that they are studying and which otherwise they could obtain only from some verbal account or from a description in a text-book. In other words, an integral part of any body of teaching should be that which is provided by those who are working at the periphery of our known field of knowledge. Their enthusiasm is always considerable and infectious, and students invariably appreciate this and respond to it.

This is in effect an extension or special application of the opinion put forward by Emerson, that: "There is no teaching until the pupil is brought into the same state or principle in which you are; a transfusion takes place; he is you and you are he; there is a teaching, and by no unfriendly chance or bad company can he quite lose the benefit."

References.

(1) John Stuart Mill, "On Liberty", Chapter 2.

(2) Lewis Carroll, "Through the Looking Glass and What Alice Found There".

(3) Chaucer, "The Squiere's Tale".

(4) John Byrom, "On the Feuds Between Handel and Bononcini".

(5) G. Bernard Shaw, "Maxims for Revolutionists".

(6) William Shakespeare, *Henry VIII*, Act III, Scene 2, line 432.

(7) Emerson, "Representative Men: Uses of Great Men".

(8) Pope, "Moral Essays", Epistle 1, line 29.

HEXAMETHONIUM BROMIDE AND KIDNEY FUNCTION.

By E. G. McQUEEN, M.B., M.R.C.P. (London), M.R.A.C.P., with the technical assistance of ELINOR TREWIN, B.Sc.

(From the Department of Medicine, University of Queensland.)

As a result of numerous publications, amongst which may be cited particularly those of Paton and Zaimis (1948), Paton (1951), and Smirk and Alstad (1951), there is now no doubt as to the capacity of hexamethonium bromide (C6) to reduce blood pressure. It would seem at first sight, however, that a significant fall in blood pressure is likely to be associated with impairment of the function of the kidney. Furthermore, renal function in most severely hypertensive subjects is already impaired to some extent. Thus it is of considerable importance to define the precise effect of C6 on kidney function.

The effects in eight cases of the intravenous administration of C6 on glomerular filtration rate, renal plasma flow and the flow of urine are reported herewith.

Methods.

Clearance of inulin was used to measure glomerular filtration rate, and clearance of diodone the renal plasma flow. Inulin and "Diodrast" were administered by continuous intravenous infusion after a loading dose. Urine samples were collected via an indwelling perforated catheter, and the bladder was washed out with saline at the end of each collection period. The amount of inulin in plasma and urine was estimated by the technique of Roe, Epstein and Goldstein, and that of "Diodrast" by that of Alpert.

The patients were all females, fasting and supine during the experiments, which were carried out between 8 a.m. and 1 p.m. Water was given by mouth before and during the experiments in sufficient quantity to produce a high rate of urine flow. When the significance of the fall in urine flow was realized, the rate of intake of water was roughly standardized at 300 to 500 millilitres per hour (depending on the capacity of the patient) for three hours before and during the experiments. This was actually applied in Experiments IV, V, VI and VIII. In Experiment VII, after the fall in blood pressure induced by C6, the patient was too faint to take more than approximately 100 millilitres per hour. In addition physiological saline was administered by continuous infusion both as a vehicle for the inulin and "Diodrast" and via the indwelling needle used for collection of blood samples. The total amount of saline infused varied, but was always in excess of the total amount of urine passed during the experiment.

After collection of two or three sets of samples for baseline values, hexamethonium bromide was given intravenously in sufficient amount to produce a moderate fall in blood pressure. A variable period of from four to fifteen minutes was then allowed to elapse before the bladder was washed out and urine collection was recommenced.

The amount of C6 injected varied from 15 to 100 milligrammes, the latter dose being used for a patient (Case IV) who had already been under treatment with C6. For the remainder this was the first dose. All were hypertensive, but the cause of their hypertension could not be definitely established. The patient in Case VI, however, had a history of lead poisoning in childhood. The manifestations of hypertension varied from subjective symptoms to those of severe vascular breakdown as shown by fundal changes. However, none of the subjects had established congestive cardiac failure.

Results.

As shown in Figure I, a fairly consistent pattern can be discerned. In those experiments in which urine collection was commenced within a few minutes of the fall in blood

pressure, a fall was obvious in glomerular filtration rate, as measured by inulin clearance, and in renal plasma flow as measured by "Diodrast" clearance. In the patients with better renal function, however (Cases I to IV), the glomerular filtration rate and renal plasma flow quickly returned towards their original values, although the blood pressure remained lowered. The renal plasma flow returned more rapidly and completely to base-line levels than did the glomerular filtration rate. The patients in Cases V and VI, with greatly impaired renal function, in whom a moderate fall of blood pressure was induced, behaved similarly. The patient in Case VII, who had considerable impairment of renal function, had a severe fall in blood pressure—from 240 millimetres of mercury, systolic, and 120 millimetres, diastolic, to 120 millimetres of mercury, systolic, and 80 millimetres, diastolic. In this case there was a severe and prolonged fall in glomerular filtration rate and renal plasma flow. This patient was the oldest of the series and had severe generalized arteriosclerosis, as demonstrated at post-mortem examination some weeks later after a cerebral vascular accident.

A striking demonstration of this phenomenon is afforded by the following experiment:

A female patient, aged forty-seven years, with moderate and very labile hypertension, during estimation of clearances suffered a pyrogenic reaction of moderate severity due to the use of a pyrogenic solution of inulin. An extreme fall in blood pressure was produced by a relatively small dose (15 milligrammes) of C6. The urine output as shown in Figure II immediately dropped to a very low level, although the inulin and "Diodrast" clearances showed no more than a minimal and transient drop before rising to supernormal figures, presumably as a result of the pyrogenic reaction. The actual figures are shown in Table I.

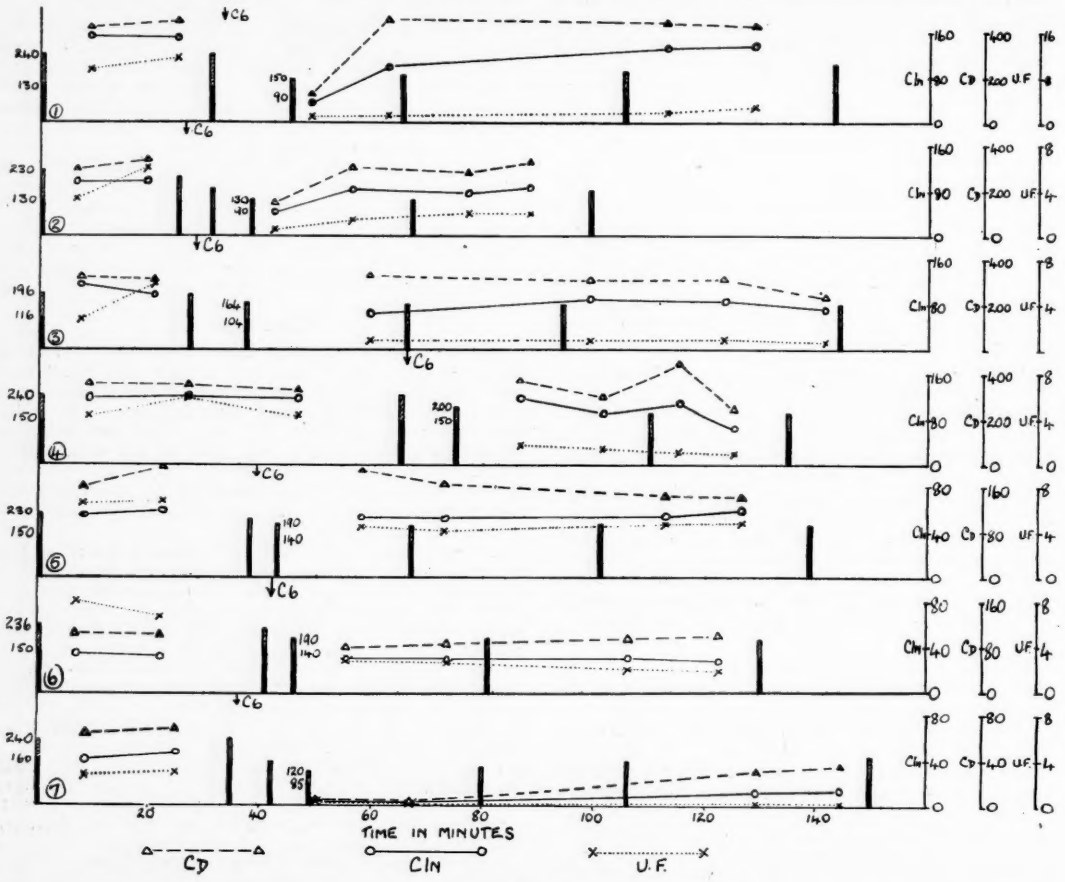

FIGURE I.

"CIn", inulin clearance; "CD", "Diodrast" clearance; "UF", urine flow. The scale at the right extremity indicates the figures for each of these in millilitres per minute. It will be noted that this differs, the cases in which renal function was poorer (which are placed below) having the larger scales. Blood pressure is indicated by the vertical columns, the height of the hatched portion indicating the systolic pressure, that of the solid portion the diastolic pressure. Time scale in minutes is shown horizontally, the commencement of collection of the first urine specimen being taken as 0. The arrow indicates the time at which C6 (hexamethonium bromide) was injected.

The fall in urine flow is associated with a fall in the rate of excretion of sodium of more or less the same order and is unaccompanied by any evidence of increase in plasma anti-diuretic substances. These observations will be detailed in a subsequent paper.

Discussion.

The sole method of removal of hexamethonium bromide once it has been absorbed is by excretion via the kidneys (Milne and Oleesky, 1951). Renal excretion is almost solely by filtration (Young, de Wardener and Miles, 1951). If excessive fall in filtration rate is produced by hexa-

The observation of most fundamental physiological importance afforded by the experiments was the fall in urine flow coincident with the fall in blood pressure. This was of a much greater order than the fall in filtration rate and persisted after recovery of the filtration rate.

methonium bromide, it will be retained in the body and its effect will continue, thus constituting a vicious circle. In patients with good renal function even a considerable fall in blood pressure is accompanied by no more than a transient fall in glomerular filtration rate and renal plasma flow. The rapidity with which these are restored indicates that renal hæmodynamic readjustments take place to compensate for the fall in blood pressure. The most likely mechanism is abolition of tone in glomerular arterioles by the C6.

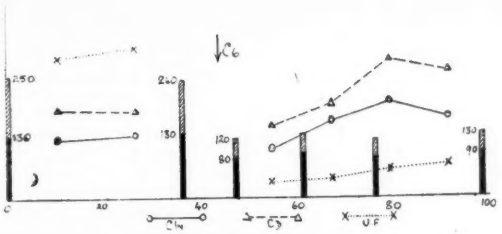

FIGURE II.

For values of individual estimations of inulin clearance, "Diodrast" clearance and urine flow, see Table I. Vertical columns indicate blood pressure (see Figure I). Time scale in minutes is shown along base line.

Even in the presence of fairly severe impairment of renal function, a moderate fall in blood pressure will not produce a dangerous fall in glomerular filtration rate. However, a gross fall may be dangerous. Experiment VII and others not detailed here suggest that patients with severe arteriosclerosis are, as might be expected, least able to compensate for a gross fall in blood pressure.

TABLE I.

Time. (Minutes.)[1]	Blood Pressure. (Millimetres of Mercury.)		Inulin Clearance. (Millilitres per Minute.)	"Diodrast" Clearance. (Millilitres per Minute.)	Urine Flow. (Millilitres per Minute.)
	Systolic.	Diastolic.			
10·5	250	130	78	359	7·2
26·5	240	130	85	352	7·6
44·0			Injection of C6.		
55·0	120	90	66	290	0·8
67·5	—	—	104	361	1·0
79·5	116	80	133	560	1·4
91·5	130	90	109	514	1·7

[1] The times are to the mid-point of each collection, with zero as the commencement of collection of the first specimen of urine.

The disproportionate fall in urine flow will not be discussed here, beyond the observation that it must be mainly tubular in origin and must result from increased reabsorption of salt and water. It is not apparently mediated by endocrine mechanisms.

Summary.

The effects of hexamethonium bromide (C6) on kidney function are described. There is evidence that abolition of tone in glomerular vessels tends to compensate for fall in blood pressure. In patients with poor renal function, a severe fall in blood pressure produces severe and prolonged functional impairment. The fall in urine flow is of greater magnitude and longer duration than the fall in glomerular filtration rate.

Acknowledgements.

The material and equipment utilized in this work were provided under a grant from the National Health and Medical Research Council, to which I wish to express my indebtedness. I wish also to thank the members of the nursing staff of the Professorial Medical Ward at the Brisbane General Hospital, who gave indispensable help.

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MEDICAL EDUCATION.[1]

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OVER the past ten years much time has been spent in discussing medical education, particularly the methods as applied to undergraduate training. A little fruit has been borne, and a few changes are taking place every year. These are mainly additions and there have been very few subtractions or radical alterations in methods.

Except in Edinburgh, in a few other overseas schools, and more recently in Melbourne, any changes have been all an index of the age of specialization in which we live. It would be more pertinent to say "the age of fragmentation", as the gaps between the various specialties are widening and interweaving of the fragments is becoming increasingly difficult. This fragmentation has probably done more towards lowering the general standard of medical graduates than any other trend. A type of student is being formed who thinks of medicine as composed of so many distinct parts, some larger than others, but all very important, as examinations are held in each specialty without adequate consideration of associated branches. He is encouraged in this attitude by many of his teachers, who stake out larger claims in their respective spheres, as if the student was training for these specialties and was not a general practitioner in embryo.

What is needed is an integration of the knowledge in each field; this would be to the advantage of the specialties, and to the student a basis of understanding medicine as a whole. Even in the specialties themselves there is a tendency towards fragmentation; the student is taught bacteriology as a subject separate from morbid anatomy; he learns that many staphylococci are coagulase-positive and retains this fact quite separately from the fact that most staphylococci form localized lesions in the human body.

Even when medical education of the undergraduate is discussed, it is divided into pre-clinical and clinical years, and students feel that there are two distinct parts to their course rather than that the whole is forming the basis on which they will have to build their future life, whether that is in general practice, in the academic sphere or in the specialties.

Aim of Medical Education.

Most discussions of medical education centre around the methods and not the aim. If the aims were clearly defined and discussed the methods could be altered to achieve this aim, even if it meant radical changes, and the sacrificing of seemingly important fragments to achieve a more satisfactory whole. Our aim is the most the student can hope to accomplish in six years of undergraduate education.

[1] Read at a meeting of the South Australian Branch of the British Medical Association on March 27, 1952.

What is our aim?

Professor W. G. Barnard, Dean of St. Thomas's Hospital Medical School, states that "we are trying to give a medical education that will serve as a basis on which the general practitioners, and practitioners of all branches of medicine, can build". Note that he particularizes and includes the general practitioner primarily, and then mentions all other branches. He also mentions that one is only aiming to give a basis on which to build. No matter how much the general practitioner is criticized, the good general practitioner still is, and will remain, the cornerstone of medical practice, and in these days of fragmentation he is becoming increasingly important as the one link which will hold the fragments together, integrate the specialties and save medicine from becoming a trade.

Our aim, therefore, should be to produce a graduate capable of becoming a good general practitioner. This is not a basis that can be measured in scholastic levels alone, but is a question of development of character and accuracy as well. In the process of planting the seed we must also cultivate the soil. What of the soil on the day of graduation? It is a pasture lacking individuality and bristling with the stalks of factual knowledge—with unsteady heads swollen with techniques ready to be blown away by the next breeze of new development.

The average student on graduation lacks initiative, has very little power of accurate observation or of logical reasoning, even less power of accurate description, and remarkably little precision in the use of words. An almost lost attribute is that of curiosity, and we are developing a man who would far sooner be taught than learn.

The student graduates feeling different from the rest of the community and is usually unaware of the existence and importance of large masses of it. He knows much more about the diseases than the people who suffer from them. He graduates ready to be served, but not so sure that he wants to serve, and accepts the position he now holds in the community as his right rather than as a privilege won in the past by service to the community.

The student is only in a very small part to blame, and the foregoing is largely a confession of failure on the part of the teachers. Unfortunately, the undergraduate must be a reflection of our times, in which most people are content to be led by the vociferous few rather than think for themselves, and in which the "importance of things" is measured by the immediate effect upon themselves, with little or no thought for the future or for the other man.

Perhaps I have painted too black a picture; but the tendency now is to ask "what can I get out of medicine?" not "what can I put into medicine?" How, then, can these trends be stopped and the deficiencies lessened? I shall not presume to give any of the answers, but will try to give a general basis for improvement.

General Basis for Improvement.

To stop the undesirable trends we must aim (i) to put forward an educated, not a trained, graduate, (ii) to teach the student to learn. The second large basis for improvement is to alleviate the deficiencies in the subject matter of the course. There are two obvious paths open: (i) to insert more into an already overcrowded and disjointed course, or (ii) to integrate what we have. The first obviously is not the answer, but is largely what is happening at present with each specialty crying out for more consideration. Integration of the teaching is the only answer, and with it the present subject matter could be welded into a much more satisfactory whole.

With the fragmentation of the medical course, there is each day more emphasis on training than on education. The very essence of training is to impart some known method or technique to meet the demands of some specialty existing at the moment, whether this is throwing the discus or treating carcinoma of the head of the pancreas. It does not indicate any flexibility or power to meet an entirely different set of circumstances in the future. A certain degree of training is necessary, but it should be directed towards forming a broad intellectual foundation, which is the basis for a variety of branches and capable of development in the lines of stresses and paths still undefined. As the unknown cannot be particularized, this basis must of necessity be broad and representative.

If training becomes too technical, one is capable of meeting only the stresses present at the time; techniques are continually changing, whereas fundamentals never alter. If medical education veers too much towards training, techniques may become static, and we shall be left with a group incapable of further intellectual development but skilled in the techniques and ideas of others.

The second point is that too much stress is laid on teaching rather than on learning. It was Flexner who remarked that "medicine is learnt, it is not taught". Teaching is necessary; but let us give the student the basis on which to learn rather than "ram in" masses of factual knowledge which will come with time if the principles and interest are there. Let us guide, not shove—it is the latter which destroys the student's initiative and with it his curiosity and enthusiasm and his power to profit fully from continued experience. Responsibility for this defect in the graduate's character largely rests at the feet of the teachers in the "pre-clinical subjects", in which there is no proper dovetailing of the subjects and slight appreciation of the ultimate aim, and the student's progress is often illogical and fragmentary. There is an urgent demand for closer integration of the so-called pre-clinical subjects and an even greater urgency for bridging the gap between pre-clinical and clinical studies.

For the teaching of anatomy and physiology, freer access to patients than exists in many places at present would be advantageous. It would bridge that gap and also help to cultivate in the student's mind a desire to learn from observation and to reason logically. His keenness would be fostered in realizing that he is being taught important fundamentals and that these provide the basis from which he can profit by experience in the future. This keenness to learn could be formed further in the pre-clinical days if there was eliminated from the curriculum—and therefore from examination—a mass of detailed information which serves only to clutter a groping student's mind and stills much of the enthusiasm and willingness to learn which may be dormant. Much would be gained if the time so saved was spent on informal lectures in the history of medicine.

What one must nurture is the power and will to assess knowledge critically, to reason logically, and to observe and describe accurately, thereby laying a firm foundation on which future facts and experience can flourish.

Seldom have I felt my poor understanding of physics and chemistry, but daily I feel my lack of knowledge of statistics, history and English literature. What has impressed me most about the overseas travelling professors is not hearing them speak—I have often been disappointed—but seeing them examine a patient. Their powers of observation, reasoning and description far surpass those of us Australians. I am sure these powers are developed before their clinical days by a much more liberal education in the arts and classics, which are an essential basis for a broad intellectual development. It was Winston Churchill who said: "The more one looks back, the further one can look forward."

The student arrives at his clinical years very eager to be taught, but not quite so eager to learn. Learning demands thinking, together with an interest in and love for the work. This can never be stimulated by pre-clinical years in which the mind is flooded with a coldly systematized coverage of uncorrelated scientific subjects in a factual manner. In both the pre-clinical and clinical subjects there are plenty of well-illustrated text-books, and the purpose of the lecture should be to arouse a lively interest in the subject rather than to cover it systematically.

"Hospital Years."

If we can iron out the defects in the pre-clinical days and make the passage of the student to his clinical days the obvious sequel of his pre-clinical learning and not a

jump over a gap into the unknown—what then of the hospital years?

Pathology.

Here again the student finds two main fragments occupying his time: pathology and its branches as opposed to the wards and the out-patient department. Even such a drastic change as the making of the hospital staff and clinical teachers entirely responsible for the teaching of pathology has been suggested.

After an introductory course of lectures on the basic principles of the various branches of pathology, much more use should be made of the following: (i) The bedside and the operating theatre for the teaching of pathology; (ii) the post-mortem room and laboratories for the teaching of medicine, and with it the integration of ward work and pathology. (The above-mentioned steps necessitate closer cooperation between the pathologist and the clinician, the more frequent presence of the pathologist in the ward and conversely the regular attendance of the clinician in the post-mortem room, each man to give his summary of the case and correlate the findings.) (iii) Frequent clinico-pathological demonstrations with fresh specimens before the students' eyes, and lively discussion and debate between the clinician and pathologist.

The foregoing methods of teaching should be spread throughout the hospital years and will not necessitate any more time on any branch. If they are well presented the student will learn a very large portion of pathology, surgery and medicine without recourse to didactic lectures and specimens in a bottle, far removed from the wards. The undergraduate will learn better to observe and describe accurately, then to reason logically and, most importantly, to integrate his knowledge.

The Patient.

What of the students' introduction to the patient?

Too much stress is laid on the abnormal rather than the normal. The basis of all teaching should be a thorough grounding in the normal—it is only by knowing the normal that one recognizes the abnormal. How few students on graduation know what constitutes the physiological, the physical and especially the psychological basis of normal man!

There is always a loud cry that there is not enough material with which to teach or on which to learn; but what a waste of normal chests, normal fundi, normal ears, normal abdomens and normal limbs, which have never been touched, there is in the wards and particularly in the out-patient department. What a waste of the normal man, who has never been spoken to or understood!

I am sure that the undergraduate's power to develop and to profit from future experience would be greater at the end of his fourth year than it is now if in the first six months of clinical tuition his interests were guided only to the normal and its wide range.

Crowded public wards crammed with serious surgical and medical cases and rarities play a large part in stifling the groping student's enthusiasm for knowing man and medicine. He feels he must get to know all about these diseases—he tries to run before he has a firm base on which to walk.

The obvious always impresses most; the student may spend hours assisting and being impressed by the technical details of a gastrectomy, hours watching the electrolytic balance, but then interest lags—not only in the student but in most teachers. The ultimate result and the return of the man to his outside environment are usually lost sight of. The course of the disease has been watched, the technique of the operation learnt, but the man forgotten. What basis does this give the confused student for understanding people, and for realizing his responsibilities to the community and the future? What a difference there is in the manifestations of disease and its treatment in a chronic alcoholic labourer as compared with the local parson!

Our generation has graduated, sadly lacking the power to reassure the patient and instil into him the confidence that we understand him and his problem. He has more faith in our chemotherapy and forms than in us. It was Tolstoy in "War and Peace" who said that the need of the sick man for the doctor was the need of his reassurance that something was being done rather than of his medicine.

It is only by the student's nearer approach to man in his own environment and by his getting a broader concept of medicine that some of these tendencies can be stifled; here I offer but two suggestions: (i) more use and correlation with the wards of the out-patient department; (ii) more use of the senior general practitioner.

At present, as far as teaching is concerned, the out-patient department is subsidiary to the wards. I feel that the student would be given a better basis for his ultimate tasks if far more use was made of the out-patient department, even if it meant sacrificing some lectures and some of the time spent in the wards. Most stress is laid on the rarities and serious cases, owing to the time spent at lectures and in the wards. Very little theoretical, and much less practical instruction is given on the diseases most commonly met with in general practice.

Even the much maligned "chronic" clinic at the out-patient department is far more remunerative in general knowledge and experience than standing around a bed for two hours and being "pounded" on the various manifestations of Parkinson's disease, disseminated sclerosis, or the Guillain-Barré syndrome—an experience that has happened to us all. How much more useful it is to see a carcinoma of the lip or carcinoma of the rectum "straight from the street", than to stand for long periods holding a retractor on the outskirts of a block dissection of the neck or an abdomino-perineal resection! What is more, the student becomes aware of and sees the problems and background of these people with the disease. He sees also the problems confronting the patient on his discharge from the ward, and the ultimate result of complex technical procedures.

To get the benefit of the out-patient department it is not necessary for the student to attend the senior man's clinic, where more often than not only a selected section of cases are seen. By standing beside the junior physicians and surgeons he sees the great mass of everyday cases —cases are not selected, rapid decisions are made, the possibility of error exists, and text-book pictures are surprisingly often seen. Here, quite often, the student is the patient's first contact with the hospital, and the student, feeling this, builds up that sense of responsibility to the patient which is so necessary. He also gains in keenness to find some reason for the patient's ailment before it is discovered by others. He also sees the man as he is, not having been washed, admitted to hospital and put to bed. He may also meet the patient's family, and certainly gets a much better picture of the patient's social and economic background and problems.

I say, without comment, that an almost criminal defect in our South Australian method of educating the undergraduate and house surgeons is the very poor integration between the wards and the out-patient department and the follow-up of the patient in the out-patient department once he has been discharged from the ward.

General Practice.

It is in general practice alone that full individual responsibility is taken for a patient, and it is only here that one can learn how important in most cases are the social, spiritual and economic aspects of the patient in the manifestations of his disease. It is here also that all the isolated facts are shown to be interwoven. In his senior years the student does need some time free from the bogy of compulsory lectures and ward rounds, for the integration of at least a few of his disjointed facts.

The importance of general practice in educating the undergraduate has been recognized at Edinburgh for many years. Until 1948, students were required to attend one of the four public dispensaries for two academic terms,

and in certain cases were able to visit the patients in their homes. With the introduction of the *National Health Service Act* in 1948, the demand for these dispensaries largely disappeared. The University of Edinburgh then took over the Royal Public Dispensary and charged the Department of Health and Social Medicine of the university with the task of establishing a teaching general practice. All phases of general practice—social and medical—are available, and the practice is essentially the same as any other general practice. Apparently the scheme does lack some features, which are being accentuated by time, as the staff consist entirely of full-time paid university employees; this, with time, may bring the scheme on to a more academic plane than was originally planned. It is, nevertheless, a step in the right direction and provides about 40 students yearly with three months' experience in general practice.

That medical students must be taught this aspect of their craft by those who practise it is fast being recognized. Westminster and Sheffield, to mention only two medical schools, are for one or two weeks a year "farming out" final-year students to attend the surgeries and visits of selected general practitioners. In Melbourne last year a similar experiment was successfully tried at the Alfred Hospital and Saint Vincent's Hospital, where fifth-year students spent two weeks with general practitioners. This year the Royal Melbourne Hospital is sending final-year students to city general practitioners for one week. These periods are too short, but the schemes are in their infancy and as yet not compulsory. Once properly instituted and included in the curriculum, in substitution for some more technical and factual period, they will bear fruit one-hundredfold, especially if they are extended to include selected country practices. A period of two months would be of inestimable value, both to the apprentice and to the master. It would give the master a measuring stick, an impetus to improve his practice of medicine, and remove any sense of complacency which may be returning. To the student it would be a period of readjustment and integration, of seeing medicine without many of the ancillary aids, and of developing his powers of observation, assessing facts and reasoning logically from first principles. Of paramount importance, it would give the student some basis of understanding and appreciating man and make him realize the importance of the doctor's personality and understanding in the treatment of the majority of common diseases, and his reliance on fundamental principles whether of the humanities or of medicine.

Conclusion.

In conclusion I leave you three thoughts: (i) teaching to learn; (ii) education, not training; (iii) integration.

TREATMENT OF RHEUMATOID AND OSTEO-ARTHRITIS BY SODIUM PARA-AMINO-SALICYLATE WITH PRESENTATION OF CASES.[1]

By MICHEL BROUS,
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THERE is a similarity of action between the para-aminosalicylate group of drugs and cortisone or ACTH, mainly on potassium metabolism. The protein anabolism is also influenced similarly by these two groups of drugs.

Recently some work has been carried out on the anti-allergic action of PAS (Trethewie, 1952), and there has been some work done as well on the influence of sodium salicylate on creatin and uric acid excretion and on the eosinophile cell count (Roskam, Van Cauwenberge and Mutsers, 1951).

[1] Read at a meeting of the South Australian Branch of the British Medical Association on March 27, 1952. At the commencement of the meeting Dr. Brous showed several patients.

I employed sodium para-aminosalicylate therapy for the first time twelve months ago in two cases of rheumatoid arthritis. One of these patients is here for demonstration. The other case of these two is that of a man, aged sixty years, who came to me with progressive and active rheumatoid arthritis. Now, after treatment, he has returned to his country home, having apparently completely recovered. The first patient, whom you will see, had suffered from rheumatoid arthritis for eight years. He has completely recovered with the oral administration of sodium para-aminosalicylate only.

The effect of sodium para-aminosalicylate therapy in these two cases produced similar results to the effects obtained with cortisone or ACTH, but with a pronounced absence of the complications known to be caused by cortisone or ACTH.

With these encouraging results I tried the sodium para-aminosalicylate in a few cases of osteoarthritis. The time allotted to me does not permit me to expand on the pathology and relationship of rheumatoid arthritis and osteoarthritis, which I consider more closely related to each other than is generally admitted. There are three patients suffering from osteoarthritis for demonstration.

Originally I used para-aminosalicylic acid, but with further experience I substituted the acid with sodium para-aminosalicylate, which appears to be more effective without causing toxic complications such as crystalluria, gastric disturbances and exfoliative dermatitis.

The results obtained in cases of osteoarthritis with the oral administration of sodium para-aminosalicylate only were not so dramatic as in the rheumatoid type.

It is known that osteoarthritis does not respond at all to cortisone or ACTH. The results obtained with sodium para-aminosalicylate given orally in osteoarthritis made me think either that the dosage was insufficient or that the local pathological changes were too advanced. Hence I added the intravenous administration of sodium para-aminosalicylate to the oral treatment, but the results still did not appear as satisfactory as one would wish.

I then used sodium para-aminosalicylate solution injected locally into the periarticular region of the affected joints, particularly at the site of maximum pain. The results were amazing. The reactions noted were as follows:

1. The injection in itself causes a severe pain which lasts only one minute.

2. As the pain due to the injection wanes, the osteo-arthritic pain disappears completely—so much so that the patient immediately after receiving the injection can walk freely and without pain. This effect is permanent only in the slightly affected joints. In the more painful joints the period of analgesia is only of eight to twenty-four hours' duration. In the beginning of treatment there may be, forty-eight to fifty-six hours later, a return of acute pain for an hour or so, but this subsides to a less acute form than in the original state.

3. The injections have been given in addition to the oral administration of sodium para-aminosalicylate and were repeated at first at forty-eight hour intervals until the pain disappeared completely, and then once a week only.

4. After injection there is loss of pain, and the return of functional movement is immediate.

5. I wish to stress that the sodium para-aminosalicylate solution used has no additional analgesic. Its chemical formula is that of two grammes of sodium para-aminosalicylate in sterile water with 0·02 gramme of sodium bisulphate.

6. The combination of the PAS with a local anæsthetic such as "Novocain" is in my experience unsatisfactory. Strangely enough the pain following this type of injection is more acute and of longer duration.

Reports of Cases.

The five cases which I have selected for presentation are as follows. Case I is a case of rheumatoid arthritis in which relapse occurred after cortisone therapy was dis-

continued, but improvement has followed sodium para-aminosalicylate therapy alone. Case II is a case of rheumatoid arthritis treated with sodium para-aminosalicylate by the oral route only. Case III is a case of osteoarthritis of the sacro-lumbar region in which improvement has followed oral sodium para-aminosalicylate therapy and periarticular injections of sodium para-aminosalicylate. Case IV is a case of osteoarthritis in which improvement has followed the oral administration of sodium para-aminosalicylate and periarticular injections of sodium para-amino salicylate. In this case there was an incidental rodent ulcer of three or four months' standing which disappeared, to my surprise, during the treatment with sodium para-aminosalicylate. Case V is one of the advanced Marie-Strümpell type of spondylitis, in which much improvement has followed sodium para-aminosalicylate given orally and by periarticular injection. Here are the cases with their histories.

CASE I.—Mrs. H., aged fifty-five years, a housewife, has suffered from the present condition for eight years; it began with pain and stiffness in both shoulders. This condition gradually spread, and soon she could not even lift her arms above her head. Her condition gradually became worse, and the disease spread to both knees and ankles and finally involved both wrists. The pain, much worse at night, was most severe on movement, or what was left of it, during the day. She could walk only with difficulty.

I examined her first three years ago. She was suffering then from generalized rheumatoid arthritis. Since she was first examined she has had the different types of treatment then available, such as gold, "Percorten" and vitamin *C* therapy, and finally, as soon as the drug became available, cortisone, of which she received over three grammes. She improved considerably during and after the treatment with cortisone. The swelling and deformity of hands, knees and ankles diminished notably, and she was able to perform some of her home duties. Soon after cortisone therapy was discontinued she gradually reverted to a stage much worse than before it was started. The pain reappeared and became unbearable again. Once more she could not raise her arms above the shoulders. The hands became distorted again, with ulnar deviation, loss of flexion of the fingers, and inability to grip objects. Walking became increasingly difficult, and she was very tired and depressed.

In November, 1951, about nine months after she had received the cortisone treatment, treatment was begun with four grammes of sodium para-aminosalicylate and half a gramme of sulphapyridine daily for fourteen days. Then I increased the dose to five grammes of sodium para-aminosalicylate and one gramme of sulphapyridine, and on this dose she has been maintained. Dramatically her condition has reached and improved upon the stage attained with cortisone. Pain has disappeared, with almost complete return of function of the joints. Walking is easy and painless. She can close both hands to a certain degree, and is able to do her own home duties and menial tasks. When asked, she affirms that she feels much better than during or immediately after the cortisone therapy.

CASE II.—The second patient was Mr. W., a labourer, aged sixty-two years. Rheumatoid arthritis commenced in this patient five years ago in the left elbow and remained there for two years. Then the condition spread to the right knee and only slightly to the left knee.

I examined this patient for the first time in November, 1951. He was suffering from advanced arthritis of rheumatoid type involving the right knee, with some involvement of the left. He was limping, and had partial ankylosis of the knee. All movement was painful, and pain was present even at rest. He could not walk for longer than a few minutes at a time. Sleep was disturbed by pain.

The initial oral dosage of sodium para-aminosalicylate in this case was three grammes per day for fourteen days, followed by five grammes per day for fourteen days, then three grammes per day for seven days and finally one gramme per day for three weeks. Soon after the initial dose of three grammes per day, his condition improved remarkably, with complete disappearance of signs and symptoms. At the end of the third week of only one gramme of sodium para-aminosalicylate per day pain returned. I then advised the patient to take five grammes of sodium para-aminosalicylate per day for one week, and then this dose was reduced gradually to two grammes per day. The recovery in this case is complete, with disappearance of pain and freedom of movement.

CASE III.—The patient was a widow, Mrs. J., aged fifty-nine years, a housewife. Twenty-one months ago she began to complain of pain in her lumbo-sacral region, shooting into the right leg. The pain gradually became worse and the patient developed severe kyphosis.

I examined this patient for the first time four months ago. Her condition was that of chronic osteoarthritis involving the lower part of the spine with severe kyphosis and scoliosis, as well as sciatica on the right side. When she came into my rooms for the first time she could walk only by holding her knees with both hands, and each step was exceedingly painful.

Treatment was begun in this case with the administration of five grammes of sodium para-aminosalicylate during the first week. Then she was given six grammes per day until now. At first improvement was obvious, but after a week or so it came to a standstill. No variation of oral dosage of sodium para-aminosalicylate seemed to advance her improvement beyond this stage. Therefore in January she was given paravertebral injections of para-aminosalicylate. These were administered on alternate days, and with improvement, once a week. This treatment she receives at present, together with sodium para-aminosalicylate by mouth.

Her condition with this type of treatment has improved remarkably. After the injection, pain disappears for a period of five to six days. She is able to walk freely and to perform her home duties, such as doing the washing, or cutting the lawn. The kyphosis and scoliosis are much reduced. She still has bad days, but is much less handicapped.

I wish to stress that this patient would have had no benefit at all from cortisone.

CASE IV.—The fourth patient was a widow, Mrs. N., aged sixty-nine years, a housewife. This patient has had osteoarthritis in both knees for twenty years. She had been under treatment at the Royal Adelaide Hospital intermittently until four years ago, when she had intraarticular injections of lactic acid without results.

I examined this patient for the first time in December, 1951. She complained of pain in both knees when walking, and in both hands. Incidentally she had a rodent ulcer on her nose near the right nostril. She had been treated surgically at the Royal Adelaide Hospital four years earlier for rodent ulcer of the right ear lobe.

Sodium para-aminosalicylate treatment was commenced with an oral dose of six grammes per day for fourteen days, then increased to nine grammes per day with the addition of one gramme of sulphapyridine per day. During this intensive treatment both pain and rodent ulcer disappeared (the rodent ulcer to my very great surprise). After the initial improvement, in spite of oral sodium para-aminosalicylate therapy, the pain returned. Therefore in January paraarticular injections of sodium para-aminosalicylate were commenced, given on alternate days, and later only weekly.

Improvement is dramatic. The pain caused by the injection, though severe for a minute, disappears with the original osteoarthritic pain. Movement is free of pain, and longer walking distances can be covered without difficulty. Sleep is undisturbed.

This patient would have had no benefit from cortisone or ACTH.

CASE V.—The patient was Mr. H., aged forty-three years, an invalid pensioner. Twenty years ago he developed at first stiffness, then pain in the lumbar part of the spine. The pain increased, interfering with walking, and the stiffness spread over the whole of the spine, involving the neck, in a period of twelve months. This pain was excruciating and continuous. Nine years ago he gave up work and was totally incapacitated, moving only with the aid of a stick and the help of another person. Even then walking was very slow; it took him two minutes to drag one foot forward. Most of the time he was bedridden. Sleep was sporadic, interrupted by pain. His appetite was poor.

When the patient was first examined in February, 1951, he was suffering from generalized spondylitis of Marie-Strümpell type. He had complete ankylosis of both hips and a rigid, twisted spine, and was unable to move his head either sideways or upwards. He could not even lift his hands to shave himself.

At first he had a course of approximately three grammes of cortisone. During and after cortisone therapy the pain was relieved, but there was no improvement in his ability to move. The pain returned with greater intensity soon

after cortisone therapy was discontinued. From then until August, 1951, the patient became bedridden again, and his condition was much worse than before cortisone therapy, especially as added to the pain and incapacity was his intense disappointment.

The oral administration of sodium para-aminosalicylate was begun at the end of August, 1951, with six grammes per day for one week, then twelve grammes per day, followed by sixteen grammes per day for fourteen days. This was gradually reduced to eight grammes per day. At the same time intraarticular, periarticular and paravertebral injections of sodium para-aminosalicylate were given according to his condition twice a week or even daily. The improvement is truly startling, when the original state of the patient and his disease are considered. He can walk unaided without a stick, and quite easily with sticks. His pain is slight on certain days only, and his appetite and mental outlook are very much improved. He sleeps through the night. He can now lift his hands above his head. There is some movement in the neck, in the dorsal part of the spine and in both hips. He is still under treatment.

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THE SHOULDER–HAND SYNDROME.

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THE name "shoulder-hand syndrome" was first used by Steinbrocher (1947) to include a number of conditions which had previously been described under various titles, such as periarthritis of the shoulder following coronary occlusion, post-infarctional sclerodactyly, and stiffness of the shoulder and hand following hemiplegia.

The shoulder-hand syndrome is not uncommon, but it is often not recognized. Its mechanism is unknown and its treatment is therefore empirical and not satisfactory. It is important to recognize the syndrome in order to give an accurate prognosis and to reassure the patient that he or she is not suffering from arthritis.

Symptoms and Signs.

The shoulder-hand syndrome consists of four groups of symptoms. In order of frequency these are as follows: (i) the stiff shoulder; (ii) thickening and contractures of the palmar fascia; (iii) stiff fingers; (iv) vasomotor changes in the hand.

These symptoms may occur together, or any one symptom may precede any other by an interval of days, weeks, months or years. The long interval between some of the symptoms has not previously been stressed. The symptoms may occur on one or both sides and in almost any combination. Table I shows the individual symptoms in 23 recent cases of the shoulder-hand syndrome, and it illustrates how the various symptoms may be disseminated in both time and site in the individual patient.

The Stiff Shoulder.

The stiff shoulder may be unilateral or bilateral. In the latter case the shoulders may be affected simultaneously or at different times. Pain is felt in the shoulder or at the deltoid insertion. It may be referred down the arm to the dorsal aspect of the forearm and hand. It is usually constant, worse on movement of the shoulder, and worse when the patient lies on the affected side. The patient experiences difficulty in dressing and undressing, particularly with those movements which involve elevation of the arm or putting the hand behind the back. Examination reveals limitation chiefly of abduction and rotation of the shoulder joint. Flexion and extension are relatively unaffected. If the anterior and posterior folds of the axilla are palpated with one hand while the other abducts the arm passively, it will be noted that abduction of the shoulder is limited mechanically and not by muscular spasm. There is usually some wasting of the muscles around the joint. The pain persists for several weeks or months and then gradually subsides. Movement of the shoulder may then gradually return to normal, or the shoulder may remain stiff to a greater or lesser degree.

Thickening and Contractures of the Palmar Fascia.

Thickening of the palmar fascia may affect one or both sides, and the palm may be affected on the same side as the shoulder or on the opposite side. The thickening is often present when the patient is first examined, and the exact time of its onset may be unknown, as it comes on so gradually. Occasionally thickening of the palmar fascia precedes the other symptoms by many months, a fact which we think is of some importance in attempting to explain the mechanism of the syndrome.

There may be a thickening on the palmar aspect of the fourth metacarpo-phalangeal joint, a thickening running transversely across the palm near the distal palmar crease, or a Dupuytren's contracture. Occasionally there may be gross thickening and contractures of the palmar fascia with resulting deformities of the fingers, which become flexed into the palm.

Stiffness of the Fingers.

The fingers of one or both hands may become stiff. Commonly the stiff fingers are on the same side as the stiff shoulder. The fingers of both hands and only one shoulder may be affected, but we have not seen stiff fingers on one side and a stiff shoulder on the other. Stiffness of the fingers may occur without vasomotor changes.

Vasomotor Changes in the Hand.

The hand and digits may first be uniformly painful, swollen, pink and warm. Flexion and extension of the metacarpo-phalangeal and interphalangeal joints are limited, and forced passive flexion or extension of these joints is painful. This stage may last several weeks or months, and is then followed either by recovery or by a second stage in which the hand and digits become permanently bluish, cold and wasted. In this second stage active movements are still limited and forced passive movements still painful.

Radiographic Examination.

Radiographic examination may reveal either spotty or diffuse decalcification of the head of the humerus, or of the hand, or of both.

Diagnosis.

It is not actually possible to draw a hard-and-fast dividing line between the complete shoulder-hand syndrome and a stiff ("frozen") shoulder, all gradations occurring between the two as in the following group of cases:

CASE VI.—The patient had a complete shoulder-hand syndrome, with painful, stiff shoulders, a painful, stiff, pink, warm, swollen hand, later becoming cold, blue and atrophic, and thickening of the palmar fascia; all these symptoms occurred together. (See Table I.)

CASE X.—The patient had an incomplete shoulder-hand syndrome—stiffness of the right shoulder in June, 1947, stiffness of the left shoulder in June, 1949, and thickening of the left palmar fascia in February, 1950. (See Table I.)

CASE XI.—This patient had an incomplete shoulder-hand syndrome, with thickening of the right palmar fascia, followed by stiffness of the left shoulder three months later. (See Table I.)

CASE XXIV.—This patient had a stiff right shoulder, followed by a stiff left shoulder twelve months later.

CASE XXV.—This patient had one stiff shoulder without any other features.

TABLE I.

Case Number.	Cause.	Time of Onset of Stiff Shoulder.		Time of Onset of Stiff Fingers.		Time of Onset of Vasomotor Changes.		Time of Onset of Thickening of Palmar Fascia.	
		Right.	Left.	Right.	Left.	Right.	Left.	Right.	Left.
I	Idiopathic.	June, 1947.	Feb., 1948.	Feb., 1948.	June, 1948.			Nov., 1948.	Nov., 1948.
II	Arthritis of wrists.	July, 1948.	July, 1948.					July, 1948.	July, 1948.
III	Injury.	Aug., 1949.	Aug., 1948.		Dec., 1948.		Swelling, pinkness and warmth, Dec., 1948.	Aug., 1949.	
IV	Idiopathic.		Early 1947.			Swelling, Sept., 1948.	Swelling, Sept., 1948.		Found on examination.
V	Idiopathic.	Mar., 1949.		Mar., 1949.	Mar., 1949.			Found on examination.	Found on examination.
VI	Dermatitis.		Sept., 1949.	Aug., 1949.	Aug., 1949.	Swelling, pinkness and warmth, Aug., 1949.	Swelling, pinkness and warmth, Aug., 1949.		
VII	Injury.	Sept., 1949.						Found on examination.	Found on examination.
VIII	Idiopathic.	Feb., 1950.	Dec., 1949.	Jan., 1950.	Dec., 1949.			Found on examination.	Found on examination.
IX	*Herpes zoster.*	Jan., 1950.		Jan., 1950.		Swelling, pinkness and warmth, Jan., 1950.			
X	Idiopathic.	June, 1947.	June, 1949.						Feb., 1950.
XI	Idiopathic.		Dec., 1949.					Sept., 1949.	
XII	Idiopathic.	Jan., 1950.	Jan., 1950.		Jan., 1950.			Jan., 1950.	Jan., 1950.
XIII	Hemiplegia.		June, 1950.		June, 1950.		Swelling, June, 1950.		
XIV	Idiopathic.	May, 1950.	Feb., 1949.					Early 1950.	1948.
XV	Injury.	Sept., 1950.						Found on examination.	Found on examination.
XVI	Idiopathic.		Sept., 1950.		Sept., 1950.			Found on examination.	Found on examination.
XVII	Idiopathic.	Dec., 1950.							Found on examination.
XVIII	Idiopathic.		June, 1950.					June, 1950.	June, 1950.
XIX	Idiopathic.	Mar., 1950.						Feb., 1951.	
XX	Idiopathic.	Aug., 1950.	Aug., 1950.						Found on examination.
XXI	Idiopathic.	July, 1950.	Jan., 1951.					April, 1951.	Aug., 1949.
XXII	Empyema, 1926; upper respiratory tract infection, June, 1951.	1926.	1948.	June, 1951.		Swelling, June, 1951.		1926.	1949.
XXIII	Idiopathic.	April, 1951.						1933.	1933.

It is therefore possible that the common stiff shoulder should be regarded as an incomplete variety of the syndrome, and perhaps the same may be said of thickenings of the palmar fascia.

Diagnosis is usually easy, but the shoulder-hand syndrome, particularly when bilateral, can easily be confused with rheumatoid arthritis; in fact, the two conditions may occur in the same patient. The differentiation depends upon the following criteria. In the shoulder-hand syndrome the hand and fingers, if involved, are uniformly swollen, there is limitation of movement of all the finger joints, and there is no true joint swelling. In rheumatoid arthritis the whole hand may be stiff, but the swelling affects only the proximal interphalangeal and metacarpo-phalangeal joints and usually not all of them. The blood sedimentation rate is normal in the shoulder-hand syndrome. It is usually increased in rheumatoid arthritis; but a normal rate does not exclude this disease. Radiography does not help differentiation, as the hand may be decalcified in both conditions.

Ætiology.

The causes of the shoulder-hand syndrome are as follows.

1. The condition may be idiopathic. In most cases the shoulder-hand syndrome appears to arise without obvious cause; but in many cases pain in the shoulder precedes stiffness, and it is then possible that the syndrome is secondary to a primary shoulder lesion.

2. It may be due to shoulder lesions. The shoulder-hand syndrome may follow any painful shoulder lesion, rheumatic or traumatic—for example, supraspinatus tendinitis, bicipital tenosynovitis, soft tissue injury, dislocations or fractures.

3. Cervical disc degeneration and protrusion may be responsible. The shoulder-hand syndrome may complicate a cervical disc lesion. A patient in whom the diagnosis of cervical disc disease is certain may eventually develop a stiff shoulder, causing one to doubt the original diagnosis. When it is realized that the shoulder-hand syndrome may complicate cervical disc disease, the presence of the two conditions in one patient becomes understandable.

4. Coronary occlusion may be the cause. The shoulder-hand syndrome is a not uncommon sequel of coronary occlusion, usually coming on a few weeks after the occlusion. It has also been reported after pleurisy and other painful intrathoracic diseases.

5. Hemiplegia may be involved. Stiffness of the shoulder and fingers and swelling of the hand frequently follow hemiplegia.

6. The patient may have had *herpes zoster*. Five cases of the shoulder-hand syndrome complicating *herpes zoster brachialis* have been reported previously—one by Marques quoted by Steinbrocher, Spitzer and Friedman (1948), two by de Takats (1945), and two by Steinbrocher, Spitzer and Friedman (1948). One of us (J.H.Y.) has seen this association once, and this case will be discussed in detail later in this paper, as it throws light on the mechanism of the condition.

7. The shoulder-hand syndrome may be due to occupational dermatitis. Two of our patients (one not included in Table I) developed the shoulder-hand syndrome during the course of an occupational dermatitis of the hands and arms. This association has not been reported previously.

8. It may be associated with arthritis. In Case II (Table I) the shoulder-hand syndrome complicated arthritis of the wrists. This patient had ankylosing arthritis of the wrists of the rheumatoid type associated with a raised erythrocyte

sedimentation rate. She later developed stiffness of both shoulders and thickening of both palmar fasciæ. After some months the shoulders recovered completely. Bayles, Judson and Potter (1950) describe two cases of classical rheumatoid arthritis complicated by a shoulder-hand syndrome. We have met with a few such cases (not included in Table I), and we are of the opinion that stiffness of the shoulder in rheumatoid arthritis is more commonly a "frozen" shoulder rather than true rheumatoid arthritis of the shoulder joint.

Mechanism.

The mechanism of the shoulder-hand syndrome is obscure. Some authors regard the condition as a "reflex dystrophy" or a "reflex sympathetic dystrophy". They do not state exactly what they mean by these words, and particularly by the word "sympathetic". It is easy to comprehend that the obvious vasomotor changes in the hand could be due to a reflex disturbance of vasomotor function, but not necessarily to a reflex disturbance of the sympathetic system. In the present state of our knowledge also it is not possible to understand how stiffness of the shoulder or thickening of the palmar fascia could be due to a reflex disturbance, particularly when the conditions may occur on opposite sides of the body. For these reasons it seems to us that the terms "reflex dystrophy" and "reflex sympathetic dystrophy" should be discarded.

Five things require explanation in this syndrome: (i) the stiff shoulder, (ii) the thickening and contractures of the palmar fascia, (iii) stiffness of the fingers, (iv) the vasomotor changes in the hand, (v) the decalcification.

It seems hardly likely that these five conditions are all due to disturbances of vasomotor nerves.

Pathology of the Stiff Shoulder.

The pathology of the stiff shoulder has been the subject of speculation for some years. The condition has been regarded as due to periarthritis or to adhesions, but these concepts are entirely theoretical and there is no anatomical or pathological evidence to support them.

Neviaser (1945) operated on 10 patients suffering from stiff shoulder and found that the essential pathological basis was thickening and contraction of the capsule, which became adherent to the humeral head. Microscopic examination revealed chronic inflammation and fibrosis in the subsynovial layer.

It has long been our view (Pearson, 1949) that the pathological basis of the stiff shoulder is simply a thickening and shortening of the inferior portion of the capsule leading to obliteration of the inferior portion of the joint and denying the humeral head the space it requires in its excursion during abduction. The following case illustrates this.

A male patient, aged seventy-one years, suffering from diabetes and hypertension, attended the Clinic for Rheumatism and Arthritis at the Royal Perth Hospital in January, 1950, complaining of painful stiff left fingers and pain in the left shoulder. The left shoulder was tender, and there was pronounced limitation of abduction and external rotation. During February the right shoulder became painful and stiff. A year later the left hand and right shoulder had returned to normal, but abduction of the left shoulder was still limited to 60°. In August, 1951, the patient died suddenly and an autopsy was performed by one of us (A.T.P.). Death was due to coronary occlusion. The shoulder joints were examined by making coronal sections. In the right joint no gross abnormality was found and its capsule was loose and free. The capsule of the left joint was thickened and contracted around the humeral head, and the inferior part of the capsule, which normally hangs in a fold, was stretched tightly between the neck of the humerus and the edge of the glenoid fossa, the space into which the head of the humerus rotates during abduction being abolished. (See Figures I and II.) The articular surface of the humerus was slightly eroded around its edges and the supraspinatus tendon was thin and frayed. There were no adhesions between the joint surfaces. Microscopic examination of the thickened capsule revealed fibrosis only.

Kessel (1950) has shown by arthrography that the inferior joint recess is obliterated in patients with a "frozen" shoulder. This suggests shortening of the inferior portion of the capsule of the shoulder joint or adhesion of this part of the capsule to the humerus, and agrees with Neviaser's operative and our own autopsy findings.

The known ætiological factors causing the shoulder-hand syndrome are shoulder lesions, cervical disk disease, coronary occlusion and other painful intrathoracic diseases, hemiplegia, *herpes zoster brachialis*, occupational dermatitis of the hands and arms, and arthritis. These conditions have one factor in common—they are all conditions in which the patient may keep the shoulder immobilized. It is well known that if any joint is kept immobilized it

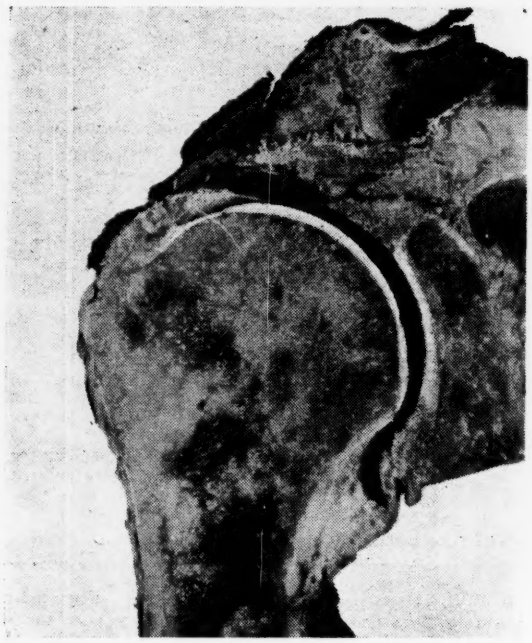

FIGURE I.

Coronal section of a normal shoulder joint. Note that the inferior part of the capsule hangs down in a fold for half an inch below the inferior margins of the articular cartilages.

may become stiff, and the shoulder is no exception. Surely this stiffness is only due to shortening and thickening of the capsule, and in the case of the shoulder to shortening and thickening especially of the inferior part of the capsule.

If a knee is constantly kept in a position of flexion the posterior part of the capsule becomes thickened, and we call this a flexion contracture. Surely if the arm is kept constantly by the side a similar condition may develop in the shoulder, and we see no reason to regard stiffness of the shoulder as anything other than what one might call an adduction contracture.

Mechanism of the Stiff Shoulder and of the Thickening of the Palmar Fascia.

We must admit that we do not know why an adduction contracture of the shoulder occurs in some people whose arm is kept in an adducted position, and not in others. We do know, however, that this contracture is frequently accompanied by thickening and sometimes by contracture of the palmar fascia. The shoulder may be affected on one side and the palmar fascia on the other, so it is hardly likely that these two conditions could be due to a reflex disturbance. We also know that the thickening of the palmar fascia may precede the other symptoms by many months. Surely this indicates that there is a constitutional

tendency to thickening of fibrous tissue in these patients. The cause of this thickening, of course, is quite unknown.

Mechanism of Stiffness of the Fingers.

In those cases in which the hand is swollen from vasodilatation, limitation of movement of the fingers appears to be due at least partly to the mechanical effect of the swelling and is analogous to the limitation of movement experienced by a normal person on a hot day if his hands are slightly swollen. In cases in which there is no swelling of the hand, limitation of movement of the fingers appears to be due to contractures of the joint capsules.

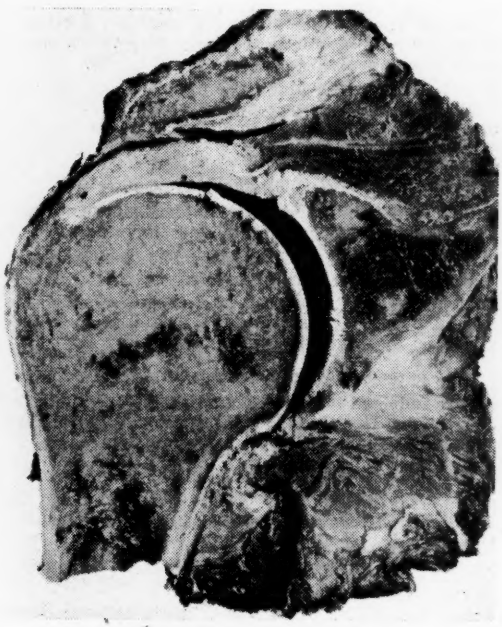

FIGURE II.

Coronal section of a shoulder from a patient who had been suffering from the shoulder-hand syndrome. The inferior part of the capsule is thickened and stretched tightly between the edge of the glenoid fossa and the neck of the humerus, to which it is adherent. Note that no joint space is visible below the inferior margin of the cartilage covering the head of the humerus.

Mechanism of the Vasomotor Changes in the Hand.

At first the hand may be warm, pink and swollen; later it may become cold, blue and atrophic. Steinbrocher, Spitzer and Friedman (1948) attempt to explain these changes as due to disturbances of the sympathetic nervous system. If this was so, it would imply that there was first a sympathetic paralysis causing the hand to be warm and pink and later a sympathetic stimulation causing it to be cold and blue. This is most unlikely, for in neurophysiology the sequence of stimulation followed by paralysis is the rule, while the reverse does not occur to our knowledge. De Takats and Miller (1943) more correctly consider that chronic vasodilatation is present in this condition.

That the changes in the hands are due to stimulation of vasodilator nerves followed by paralysis of these nerves, and not to paralysis followed by stimulation of sympathetic nerves is, we think, proved by the case of a patient suffering from the shoulder-hand syndrome following *herpes zoster brachialis*, who came under the care of one of us (J.H.Y.).

E.H.McL. was referred on February 21, 1950. On December 17, 1949, he first noticed pain in the right shoulder, and on December 22 a rash appeared on the right shoulder, the outer aspect of the arm, and the radial aspect of the forearm and thumb. The rash lasted for about two weeks. The pain persisted and involved the shoulder, arm, forearm, thumb, and index and middle fingers. Early in January, 1950, he began to complain of difficulty in using the right thumb and index and middle fingers, and these digits became swollen and numb and he felt tingling in them. When he was first examined on February 21 there were traces of a rash on the outer aspect of the right arm, the radial aspect of the forearm, and the thumb. Abduction and rotation of the right shoulder were painful and limited. The right thumb and index and middle fingers were swollen, pink, hyperæsthetic and hyperalgesic. Flexion and extension of these three digits were limited, and forced passive flexion or extension was painful. The right supinator and biceps reflexes were absent, and the right triceps reflex was diminished. Radiographic examination revealed spotty decalcification of all the bones of the right hand, and also showed the swelling of the right thumb and index and middle fingers. The patient recovered completely during the next four months.

It is characteristic of the shoulder-hand syndrome that the whole hand is involved and not only some digits; but it is suggested that this is a case of shoulder-hand syndrome following *herpes zoster brachialis* of the sixth cervical dermatome and involving only the digits in that dermatome. In the previously reported cases of shoulder-hand syndrome complicating *herpes zoster brachialis* no mention is made of the number of digits involved.

Herpes zoster is known to be an affection of the posterior root ganglion, and it is known that there are antidromic vasodilator fibres in the posterior nerve roots. It is therefore not difficult to understand how in this case an inflammatory condition in the posterior root ganglion was followed by redness and swelling in the thumb and the index and middle fingers. It seems obvious that this redness and swelling were due to stimulation of these vasodilator fibres.

We believe that the vasomotor changes in the shoulder-hand syndrome result from stimulation of vasodilator cells causing the redness and swelling. Later this stimulation ceases, in which case the redness and swelling subside; or the cells degenerate, with the result that sympathetic vasoconstrictor cells are no longer opposed by vasodilator cells and the hand becomes cold and bluish. What stimulates the vasodilator cells in the first instance is, of course, unknown.

Mechanism of the Decalcification.

It is common knowledge that if a limb is immobilized it becomes decalcified, but the reason for this is not known. Bone is laid down by osteoblasts wherever a bone is subjected to stress. If a bone is not subjected to stress, osteoblastic activity diminishes and osteoporosis follows as a result of normal osteoclastic activity. In the shoulder-hand syndrome decalcification may occur in the absence of cutaneous vasodilatation and could be due simply to disuse.

Prognosis.

Although treatment is unsatisfactory, the prognosis is usually good, many patients recovering full function even without treatment, and this fact makes difficult the evaluation of any therapeutic measure. Some patients, of course, are left with permanent stiffness of the shoulder or fingers but still retain a great deal of function. In rare instances the shoulders may remain completely stiff and the hand almost useless.

Treatment.

Until the actual cause and mechanism of this syndrome are known, treatment must be based upon theory and experience.

Patients suffering from any of the diseases which may be followed by the shoulder-hand syndrome should obviously carry out routine exercises of the shoulder, taking this joint through a full range of movement, particularly in an upward direction, several times daily. It is possible that such a programme would decrease the proportion of patients who would subsequently develop a stiff shoulder. However, it must be confessed that one patient with hemiplegia (Case XIII) was treated in this way from the onset of his condition, and he developed a stiff shoulder and hand

in spite of such treatment. It must also be admitted that he did not wear an abduction splint, and one wonders whether such a splint should be used for patients with hemiplegia. Patients suffering from painful shoulder lesions should certainly have their shoulder rested on an abduction splint and not in a sling.

Once the condition has become established, treatment must be directed at what are presumed to be the pathological lesions. If stiffness of the shoulder is due to shortening and thickening of the inferior portion of the capsule of the joint, then the only effective treatment will be to stretch, rupture or divide this portion of the capsule by exercise, manipulation or operation.

Abduction and rotation exercises are carried out and the patient is instructed to get someone to force these movements a little at their extremes with the idea of stretching the capsule. These exercises are continued for at least two months, and if the patient improves under this treatment it is continued as long as improvement continues.

If there is no improvement with exercises or if improvement does not continue, then the shoulder is manipulated under anæsthesia to try to restore a normal range of movement. We do not believe the teaching that one should never manipulate a shoulder which is painful, for we have both relieved pain and restored movement by a manipulation in such cases.

Neviaser (1945) noted at operation that the inferior portion of the capsule was adherent to the head of the humerus and could be separated from it by an elevator or by rotating the arm. He noted, too, that the capsule peeled off the head of the humerus like adhesive plaster and that the adhesion was avascular. When the capsule was separated from the humerus rotation was then free. This is possibly what happens in those manipulations which are accomplished with extremely little force.

In other cases we have noted that a rotation manipulation accomplishes nothing, and one has to use a moderate amount of force in abduction in order to restore movement. Such a manipulation is accompanied by one solid tear, is not followed by an effusion into the joint, and is occasionally followed by the appearance of a hæmatoma near the inner side of the elbow. Abduction cannot peel adherent capsule off the head of the humerus, and in these cases it seems likely that the inferior part of the capsule is actually torn. If this is the mechanism of manipulation in these cases, it could account for the one solid tear that is heard, for the absence of effusion into the joint (as any fluid would pass out of the joint into the loose tissue of the axilla), and for the occasional hæmatoma near the inner side of the elbow. Moseley (1950) states that he can palpate a tear in the inferior part of the capsule after manipulation.

We must admit that we cannot prognosticate the result of manipulation. Most patients experience immediate relief of pain, and their range of movement is much improved. Exercises are then continued. In a few cases pain is increased after manipulation, movement is painful, and any increase in the range of movement is very temporary.

The possibility of improving the range of movement by capsulotomy is being considered in relation to those patients in whom stiffness of the shoulder persists after manipulation, and in relation to those for whom manipulation is abandoned because excessive force would be required.

The results of X-ray therapy have not impressed us in the past. In future we shall try the effect of X-ray therapy directed at the inferior aspect of the joint.

Applications of heat or cold to the shoulder may be tried. Sometimes one gives relief, sometimes the other. We do not know any rules by which we can prophesy which will help the patient, but in our experience cold applications are more likely to give relief in the early painful stage and to those patients whose pain is more severe at night.

If the hand is involved, finger exercises are persisted with indefinitely.

Some authors treat this condition by blocking the stellate ganglion with procaine or by removing the ganglion, and they claim to achieve good results. However, the tendency to spontaneous improvement must always be remembered in attempting to assess the value of any treatment. One of us (J.H.Y.) has seen patients treated by sympathetic block and sympathectomy and has not been impressed by the results. Any improvement which has occurred has taken a long time and may well have occurred without any treatment. In our cases sympathetic block has not relieved pain nor has it improved mobility. Redness and swelling have not been altered, and one could hardly expect any alteration. In the later stages of this condition when the hand is cold and blue, sympathetic block may improve the circulation in the hand and may restore a normal colour temporarily. Under these circumstances we think sympathectomy may be justifiable to improve the circulation, as this may help to restore movement in the fingers.

One of our patients had gross deformity of the hand as a result of thickening and contracture of the palmar fascia. Removal of the thickened fascia by an orthopædic colleague restored a considerable degree of function to the hand and fingers.

Summary.

The clinical features of the shoulder-hand syndrome and the pathology of the frozen shoulder have been described.

The mechanism of the symptoms has been discussed but is mainly a matter of conjecture.

Evidence is presented that the vasomotor signs are due to stimulation of vasodilator cells followed either by recovery or by paralysis of these cells.

Acknowledgement.

We are indebted to the Museum and Photographic Departments, Public Health Laboratories, Royal Perth Hospital, for the photographs of the shoulder joints.

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Reports of Cases.

ACQUIRED MELANOSIS: A GRAVE WARNING.

By V. J. KINSELLA,
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MR. K.R., aged fifty-three years, presented for examination on April 1, 1949. A black patch had appeared on the skin of the left thumb over four years previously and had gradually spread until it covered about the whole of the terminal phalanx (Figure I). The patient had been reassured by many doctors (including a dermatologist, who had taken a biopsy) that the condition was harmless. A lump had appeared in the left axilla three weeks previous to his visit to me.

On examination of the patient it was noted that the nail of the terminal phalanx and most of the skin were black. The margin of the black area was sharply defined. A more intense black on the medial side met a less intense black on the lateral aspect, along a sharply defined longitudinal straight line on the nail. The black skin differed in no way from the normal skin, except in colour. Inspection by the naked eye and with a hand lens revealed normal skin ridges, with the normal openings of the sweat glands. On palpation the texture and thickness of the skin were found to be unchanged. In the axilla were large, hard lymph glands. A search failed to reveal any nodules between thumb and axilla, or elsewhere. A skiagram of the chest was normal.

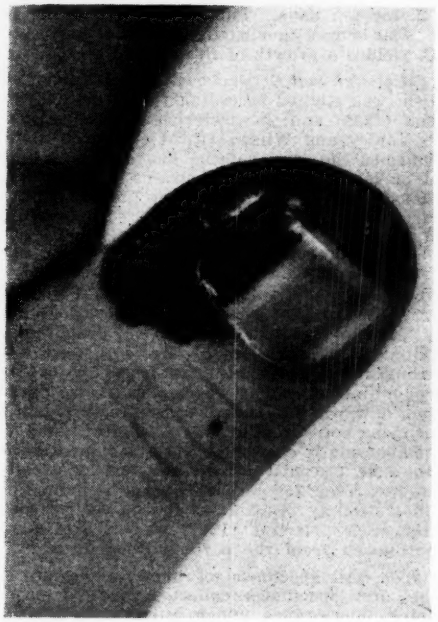

FIGURE I.

On April 22 the thumb was amputated and the axillary glands were removed. Dr. A. H. Tebbutt submitted the following pathological report:

> The axillary fat contains several massive tumours, one 5 cm. in diameter and another 4 cm. in diameter, with variegated cut surfaces, black, red and grey.
>
> Microscopical examination shows a malignant melanoma metastasis, the cells being round and polyhedral and spindle-shaped, melanin pigment is scattered amongst them and there is much necrosis and hæmorrhage.
>
> The thumb shows the nail black and the skin for some distance around is deeply pigmented. Microscopical examination of sections shows much pigment in the deeper layers of the epidermis, and in one place, under the edge of the nail, is a small mass of malignant melanoma cells which is undoubtedly the primary growth.

The patient died eleven months after operation with multiple and widespread metastases.

Comment.

This case is submitted for publication because the condition of acquired melanosis is not generally known, and when it is met with it is not always recognized as a premalignant condition and dealt with, as it should be, by thorough excision in the premalignant stage.

The condition is discussed more fully and a review of the literature is given by Fenton Braithwaite (1948). They point out that in this condition the skin is normal, except for the pigment, and that an average period of ten years elapses between the appearance of the pigmentation and the onset of malignant change. In regard to the spread of pigment in the normal skin, they describe the experiments of Billingham and Medewar, who, in guinea-pigs, transplanted skin from a black area into a white area. Pigmentation spread centrifugally from the graft into the surrounding white skin. If the skin previously white, but now pigmented, was transplanted into a white area, a centrifugal spread of pigmentation again occurred. They concluded that the spread of pigmentation was not due to a diffusion of pigment, but to an influence exerted by pigmented dendritic cells in the basal layer of the epidermis upon neighbouring unpigmented dendritic cells.

Acknowledgement.

For the excellent photograph I am indebted to Mr. R. Johnson.

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A CASE OF BRUCELLOSIS WITH ACUTE PORPHYRIA.

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AND
GEOFFREY EY,
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IN Adelaide human brucellosis is not a common infection, and the following case is of particular interest because the patient exhibited acute porphyria at the same time.

Clinical Record.

History.

The patient was admitted to the Royal Adelaide Hospital on April 21, 1950. His history was indefinite and confusing, some statements made by the patient being denied by his mother. At various times during 1943, 1944 and 1945, whilst the patient was in the army, he had been treated for impetiginous sores, scrub typhus, and benign and subtertian malaria. He stated that his last attack of malaria had occurred five months before admission to hospital, but it is thought that this was related to his present illness. He had noticed for two or three years that his urine was occasionally dark.

On January 20, 1950, he was admitted to the Northfield Infectious Diseases Hospital with a temperature of 103° F. after three days of headache and vomiting and aching limbs. He had neck stiffness and nystagmus, and his condition was diagnosed as poliomyelitis. He was discharged from hospital on February 2, 1950, with no muscle weakness.

Present Illness.

Examination of the patient showed a miserable young man, who had lost a lot of weight, who was sweating profusely, especially on the hands, forehead and axillæ, and who had *herpes febrilis* on the lip and impetiginous sores on the hands. He was tender to palpation in all quarters of the abdomen, especially in the lower half. No mass was felt. His limb muscles were tender to palpation, but all deep reflexes were present, and plantar responses were normal. He had no muscle wasting, no loss of power and no sensory impairment, but slight hyperæsthesia was present on the right side of the abdomen.

The urine was port-wine coloured, and the ward test showed the presence of bile and a gross excess of urobilinogen. As the significance of the colour of the urine

was overlooked at the time, the resident medical officer treated the patient as having pyrexia of unknown origin.

In the course of routine investigations, agglutination against *Brucella abortus* was found to have a titre of 1:2560, which on May 3, 1950, had risen to 1:10,240, and the diagnosis of brucellosis was put beyond all doubt when *B. abortus* was grown in a culture of blood collected on April 27.

By this time it had been realized that the urine contained large quantities of porphyrins and porphobilinogen, which was distinguished from urobilinogen by the Watson-Schwartz test (1941). On April 20, 1950, the first of the numerous urine examinations showed 17 microgrammes of porphyrin per millilitre, whereas the normal daily output is less than 60 microgrammes, and later the total twenty-four hours' output was estimated as 6000 to 9000 microgrammes.

On April 25 treatment with "Chloromycetin" was started, but owing to a shortage aureomycin was used from April 28 (0·5 gramme six-hourly), and this treatment was continued until May 22, 1950, by which time the agglutination titre had fallen to 1:2560.

On May 21 he still had an evening temperature of 99° F. Abdominal and limb pains were still present, he had no appetite, and he was vomiting. Salt tablets were given for the "cramps", in case the prolonged vomiting and sweating had caused salt depletion, but without improvement. Since admission to hospital the patient had required frequent injections of either morphine or pethedine, and it was not until June that he could do without them. On May 30, 1950, the agglutination titre had fallen to 1:320, where it remained for all subsequent tests. Culture of blood collected on June 5, 1950, yielded no growth of *B. abortus*.

On June 1 one of the small nodules on the hands was removed. The report on the section stated that "beneath the epithelium there is a proliferation of fibroblasts round the small vessels. No other abnormality is seen." Culture of the fluid from another nodule produced the growth of a non-hæmolytic staphylococcus, presumably a contaminant.

By the middle of June he was walking about, and from then he gradually improved, so that on June 21, 1950, he was discharged to Semaphore Convalescent Hospital, reasonably well. However, on July 4, 1950, he was readmitted to the Royal Adelaide Hospital with a recurrence of his original symptoms—headache, fever and sweating, vomiting and pains in the shoulder, neck and belly, and the passage of red urine with scalding. On admission his evening temperature was 100° F., but within a few days this had fallen to normal. The agglutination titre to *B. abortus* was now only 1:40. Porphyrins and porphobilinogen were both present in the urine in large quantities.

He was discharged from hospital on July 11, 1950, to be looked after by his private doctor, and was requested to attend the out-patient department in about three months.

He was later admitted to the Repatriation General Hospital, where he died on November 11, 1950.

Autopsy Findings.

Liver.—Macroscopically the surface of the liver was mottled, and examination of the cut surface showed miliary flecking of the tissue, which was light chocolate in colour. The weight of the liver was 70 ounces. The hepatic cells contained a diffuse brown granular pigmentation tending to be centrilobular in distribution. There were many groups of cells with cloudy swelling and early necrosis. Commencing portal fibrosis was seen.

Spleen.—There was moderate congestion of the spleen with diffuse but less brown pigment than in the liver. The capsule was thickened, and all vessels showed fibrosis.

Kidneys.—The glomerular loops of the kidneys often had slight adhesions to the capsular epithelium. The convoluted tubules contained post-mortem epithelial changes.

Lungs.—Macroscopically the lower lobes of both lungs were consolidated, with creamy pus exuding from the bronchioles, and considerable superimposed congestion. Examination of the sections showed pulmonary œdema and bronchopneumonia. The œdema was widespread but not uniform. There was much congestion, with scattered foci of pneumonia and a few areas of organization.

In other organs no significant abnormality was seen.

Cause of Death.—Death was attributed to acute porphyria with terminal basal pneumonia.

Bacteriological Examinations.

Blood Culture.—Five millilitres of blood were introduced into a bottle containing 100 millilitres of nutrient heart broth. An atmosphere containing 10% of carbon dioxide was produced in the bottle, and the whole was incubated at 37° C. for ten days. Subsequent cultivation on liver infusion agar slopes incubated in 10% of carbon dioxide at 37° C. yielded a growth of *Brucella* sp.

Differential Cultural Characteristics.—Hydrogen sulphide metabolism was studied according to the method given by Huddleson (1939) and the bacteriostatic action of dyes as given in Topley and Wilson (third edition). Both these tests confirmed the fact that the *Brucella* sp. isolated was a strain of *B. abortus*. Type strains of *B. abortus* and *B. suis* obtained from the Veterinary Laboratory, Ministry of Agriculture and Fisheries, New Haw, Weybridge, England, were included in the test for comparison.

Biochemical Examinations.

Porphobilinogen.—The first specimen of urine received (April 28, 1950) was of a dark port-wine colour and gave strongly positive results in tests for urobilinogen and porphobilinogen. The specimen collected a week later also gave strongly positive results in tests for urobilinogen and porphobilinogen, but it was not nearly so dark a red. From then onwards the urine became progressively lighter, and specimens collected on June 5, June 21 and July 10 were not abnormally coloured. These last-mentioned specimens also gave a negative result in a test for urobilinogen, while the test result for porphobilinogen remained positive, though not strongly positive, as in the earlier specimens. The Watson-Schwartz test (1941) was used to distinguish the urobilinogen from the porphobilinogen.

Porphyrin.—All specimens of urine, and more particularly the first specimens collected, showed pronounced salmon-pink fluorescence under ultra-violet light without the addition of hydrochloric acid. On one occasion this pink fluorescence was obscured by a purplish fluorescence in the supernatant fluid and a bright yellow fluorescence in the deposit. This was assumed to be due to the presence of aureomycin, which the patient had been receiving therapeutically during this period, and which is known to have yellow or blue fluorescence under ultra-violet light according to the pH of the medium. The porphyrin content was estimated by the following procedure. Ten millilitres of urine were diluted to 100 millilitres with water and 10 millilitres of glacial acetic acid added. This was then shaken with 50 millilitres of sulphuric ether for at least fifteen minutes, as the rate of transfer of porphyrin to the ether layer was rather slow. This extraction was repeated until complete, as shown by the absence of pink fluorescence under ultra-violet light on treatment of the final ether extract with 5% hydrochloric acid solution. The combined ether extracts were washed twice with 50 millilitre portions of 3% sodium acetate solution and then twice with water. The porphyrin was then taken up in 5% (weight per volume) hydrochloric acid solution and purified by neutralizing this acid extract to Congo red with saturated sodium acetate, extracting with ether and washing the ether twice with water. The ether was then extracted with five-millilitre portions of hydrochloric acid and the porphyrin content of the acid was assessed by comparing the fluorescence produced under ultra-violet light with that obtained from solutions containing known amounts of porphyrins. After extraction with the 5% hydrochloric acid solution the remaining ether showed no pink fluorescence under ultra-violet light, and it was assumed that all the ether-soluble porphyrins (coproporphyrins) had been extracted. After the initial extraction with ether the

TABLE I.
Summary of Results of Laboratory Tests.

Date.	Agglutination Reactions Against *Brucella abortus*.	Blood Culture.	Urine Tests.			
			Ether-soluble Porphyrins. (Microgrammes.)	Ether-insoluble Uroporphyrin. (Microgrammes.)	Porphobilinogen.	Colour.
24/4/50	1 : 2560					
27/4/50	1 : 2560	Growth of *Brucella abortus*.				
28/4/50		Growth of *Brucella abortus*.	4300	4000	++	Port wine.
3/5/50	1 : 10240					
4/5/50			4200	5000	+	Port wine.
10/5/50			1700	3700	+	Port wine.
12/5/50	1 : 1280					
15/5/50			1800	4000	+	Port wine.
23/5/50	1 : 2560					
30/5/50	1 : 320					
5/6/50	1 : 320		3000	460	Weak +	Port wine.
16/6/50	1 : 320					
19/6/50		No growth.				
21/6/50			2550	450	+	No abnormality.
10/7/50			1600	500	+	No abnormality.

acidified urine showed some porphyrin-like fluorescence. It was therefore shaken with several 50-millilitre portions of ethyl acetate until no more porphyrin could be extracted. The extracted urine no longer showed any pink fluorescence; so it was assumed that no uroporphyrin 1 (insoluble in ethyl acetate) was present. The combined ethyl acetate extracts were shaken with several five-millilitre portions of 5% hydrochloric acid solution until all the porphyrin had been transferred to the acid layer. In order to remove interfering compounds, the acid extract was diluted one in ten with water and three millilitres of saturated sodium acetate were added for each 100 millilitres of diluted extract. This was shaken with 50 millilitres of ethyl acetate, and the ethyl acetate then extracted with five-millilitre portions of 5% hydrochloric acid solution. The amount of uroporphyrin 111 present in the urine was calculated by comparing the fluorescence produced in the final acid extract with that obtained in standard tubes of known porphyrin concentration. Examination of the porphyrin extracts in a spectroscope showed two absorption bands, one at about 5470 to 5500 Å and another weaker one at 5910 Å.

Liver Function Tests.—On April 27, 1950, liver function tests were carried out with the following results: the serum alkaline phosphatase concentration was 8·9 King-Armstrong units; the serum colloidal gold reaction reading was 3; the degree of cephalin-cholesterol flocculation was "++" in twenty-four hours and "+++" in forty-eight hours.

Discussion.

Bacteriological evidence proves that the patient had a *B. abortus* infection, but an attempt to determine whether it was of recent origin failed (sera of nine of his relatives, with whom he had been in contact during the previous few months, were tested against *B. abortus* suspension and gave negative results). On the other hand, the patient stated that of those who had "scrub typhus" at the same time as himself, about one-third remained chronically ill, and as there is no record of a *Brucella* agglutination test having been carried out in the army on this patient, it is possible that the *Brucella* infection was present even at that stage. The symptoms of which the patient complained when he was in the Infectious Diseases Hospital for poliomyelitis were also remarkably similar to those given by Huddleson (1939) for brucellosis—namely, headache, stiff neck and muscle pains.

According to Watson (1951), although the presence of porphobilinogen is not absolutely pathognomonic of acute porphyria, its presence in other conditions is extremely rare, and, as in this case it was associated with the passage of dark red urine containing an ether-insoluble, ethyl acetate-soluble porphyrin (presumably uroporphyrin 111), there seems little doubt that this was a case of acute porphyria. The presence of sores and blisters on the patient's hands and legs did, however, suggest the possibility of congenital porphyria, but the late appearance of the lesions (which were first noticed after he joined the army) and the absence of uroporphyrin 1 excretion do not support this suggestion.

Examination of specimens of urine from four relatives of the patient showed that one, an aunt, excreted large amounts of coproporphyrin (94 microgrammes a day). Although no ether-insoluble porphyrins could be detected, the urine yielded a weakly positive result to the test for porphobilinogen, suggesting that there may have been a familial tendency to this condition.

The possibility that the acute porphyria was the result of the chronic brucellosis was seriously considered. Little is known of the cause of this condition, the outcome of which is eventually fatal. The symptoms of acute porphyria are strikingly similar to some of those of brucellosis—namely, abdominal pains, pain in the extremities, and paresis; so that once the acute porphyria is recognized the concurrent presence of brucellosis is likely to be overlooked. It therefore seems reasonable to suggest that chronic *Brucella* infection may be one factor resulting in the metabolic defect which causes acute porphyria. There is, unfortunately, no information in this case as to whether the *Brucella* infection preceded the first attack of porphyria. The dark urine was first noticed two or three years ago, but it is quite possible that it was present before this. In the only other case of acute porphyria which we have examined for *Brucella* agglutination, negative results were obtained from a specimen of blood collected a few hours before the death of the patient. On the other hand, the onset of any infection would be expected to precipitate an attack of porphyria in a susceptible individual, particularly if barbiturates were used as sedatives. In this respect it is of interest to notice that the excretion of both uroporphyrins and coproporphyrins fell as the agglutination titre fell and the patient's condition improved. The excretion did not, however, fall to within normal limits, but remained more or less constant.

Routine liver tests carried out at this time showed only abnormal flocculation reactions, such as might be expected with any chronic infection. At post-mortem examination the amount of liver damage was not great. To suggest that the liver damage might have caused the acute porphyria therefore seems unwarranted. In this connection it is of interest to note that another patient admitted to hospital in 1950, a boy of eighteen years with cirrhosis of the liver, was also found to have brucellosis. Liver tests in his case showed evidence of gross liver damage, and the urine contained excessive quantities of urobilinogen. The excretion of ether-soluble porphyrins (coproporphyrins) was raised, but ether-insoluble porphyrins and porphobilinogen could not be detected, although the great excess of urobilinogen made it difficult to interpret the test for the latter.

There is therefore no doubt that this patient had both brucellosis and acute idiopathic porphyria, but it seems unlikely that the two conditions were interrelated. Nevertheless the similarity of symptoms of the two diseases warrants a more careful examination in other cases of porphyria to see if it is more commonly associated with brucellosis than would be expected by chance.

Summary.

A case is reported of a young man who had a *B. abortus* infection and acute idiopathic porphyria, both of unknown duration.

Although it is believed that the presence of these two conditions at the same time was fortuitous, it is considered that because of the similarity of some of the symptoms of brucellosis and acute porphyria, the possibility of an association between them should be considered in other cases.

Acknowledgements.

We wish to thank Dr. A. R. Southwood, honorary physician to the Royal Adelaide Hospital, who was in charge of the patient, and the medical superintendent of the Royal Adelaide Hospital for permission to publish this report.

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CONGENITAL CYSTIC DILATATION OF THE COMMON BILE DUCT.

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CONGENITAL cystic dilatation of the common bile duct is a rarity. Zinniger and Cash in 1932 reviewed 105 cases, and Poate, after an exhaustive survey of the available literature since 1930, was able to add only a further 23 cases, including one of his own. Of the former series, 66 patients died, and of the latter, 11 died. This high mortality rate in a condition amenable to surgical treatment is of course due to unfamiliarity with it, leading to delay in diagnosis and to lack of knowledge as to how to tackle the problem when one is confronted with it. Hence it is desirable to record all known cases.

Clinical Record.

The patient was a well-grown female child, aged twelve years, first examined in hospital on March 5, 1950. Eight months previously jaundice had developed, with dark urine and light-coloured stools. The jaundice persisted, with loss of appetite and progressive loss of weight. There was only slight upper abdominal discomfort. A severe epistaxis occurred shortly before the child's admission to hospital. There was a past history of *melæna neonatorum*, measles, and appendicectomy for a perforated appendix at the age of five years.

Examination showed the patient to be tall, emaciated and deeply jaundiced. Her weight was four stone seven pounds, compared with her original weight of eight stone seven pounds before the illness began. Abdominal inspection revealed a large rounded tumour in the right half of the abdomen. Palpation showed the tumour to be cystic and slightly tender, continuous above with the liver dulness and extending well into the right iliac fossa and crossing the mid-line. It appeared almost the size of a basketball. The heart and lungs were clinically normal. Examination of the urine revealed bile in considerable amount, no albumin and a trace of sugar; microscopic examination gave normal findings. The Casoni test gave a negative result, and X-ray examination of the chest revealed normal lung fields and no elevation of either lobe of the diaphragm. A blood count gave the following information: the erythrocytes numbered 4,000,000 per cubic millimetre, the hæmoglobin value was 65%, and the leucocytes numbered 15,000 per cubic millimetre, 64% being polymorphonuclear leucocytes, 23% lymphocytes, 10% monocytes and 3% eosinophile cells. The patient had a slight irregular fever, with a temperature up to 100° F. and a pulse rate of 100 to 120 per minute.

A pre-operative diagnosis of hydatid cyst was made, in spite of the negative response to the Casoni test. Vitamin *K* therapy was begun and a blood transfusion of 400 millilitres was given on March 12.

On March 13, under ether anæsthesia, laparotomy was performed through a long right paramedian incision over the tumour. When the peritoneum was opened a huge rounded swelling beneath the right lobe of the liver presented; it was covered with omentum and displaced the transverse colon distally, while the gall-bladder was pushed upwards and laterally and compressed against the liver. Aspiration revealed turbid bile. The cyst was opened anteriorly and its contents were evacuated with a sucker, an estimated three pints of offensive turbid bile being withdrawn. It was then possible to determine the nature and relationships of the collapsed cyst. Its wall was approximately five millimetres thick, and its lining was roughened and bile-stained. Above it was continuous with the hepatic duct, which was as thick as one's forefinger, this thickening apparently being caused more by hypertrophy of its walls than by dilatation of its lumen. The cystic duct entered the upper part of the cyst where the latter became continuous with the hepatic duct; it was about the size of a lead pencil, with thickened walls. The gall-bladder was small and compressed between the upper pole of the tumour and the right lobe of the liver. Medially the cyst overlaid the first part of the duodenum, but no communication between it and the second part of the duodenum was observed. The liver was of normal size and texture.

The cyst was then anastomosed to the pyloric end of the stomach, which at the time seemed the most convenient section of the alimentary tract. The original exploratory opening into the anterior cyst wall was used, the finished stoma being approximately one inch (2·5 centimetres) in length. The abdomen was closed without drainage and a gastric tube was passed. The child stood the operation well.

Her condition remained good for twenty-four hours. Then severe diarrhœa with blood-stained stools began; this was thought due to admission of infected bile into the alimentary tract. The diarrhœa lasted several days before subsiding. During this time continuous gastric suction and intravenous fluid replacement were maintained; glucose-saline (5% glucose, 0·25% salt) solution, blood and "Parenamine" were used. It was then found that removal of the gastric tube was invariably followed by copious vomiting within a few hours. At times the amount vomited was very large, and on one occasion collapse and severe tetany occurred. It was obvious that pyloric obstruction had developed. The child was being kept alive by intravenous therapy, but she remained deeply jaundiced and was steadily going downhill, while suitable veins were becoming increasingly difficult to find. Eventually it became apparent that she would die unless the pyloric obstruction was relieved.

On April 11, under ether anæsthesia, the upper half of the wound was reopened, continuous blood transfusion being maintained. It was found that the choledochus cyst had shrunk to about the size of a tennis ball and was drawing the pylorus upwards and kinking it. Its wall was smooth and looked very vascular, and it was adherent to the pylorus over a wide area. To undo the anastomosis and transplant it into the jejunum appeared too risky a procedure, so to relieve the obstruction a posterior gastrojejunostomy was carried out. The child again stood the operation fairly well.

There was no further vomiting, but she remained ill, with deep jaundice and severe anorexia. Intravenous therapy was still required. Approximately ten days after the second operation the temperature rose to 103° to 104° F., the jaundice deepened, and pain and tenderness over the liver developed, indicating the onset of infective cholangitis. For the next four weeks the temperature remained high and the child was extremely ill. Finally streptomycin (0·5 gramme given twice daily for seven days) appeared to be the deciding factor in clearing up this complication. Thereafter progress was steady, the appetite returning and the jaundice gradually disappearing. She was discharged from hospital on June 24, 1950.

The patient is now a normal healthy girl, free from digestive disturbances and with no jaundice. Her weight is eight stone one pound and her height is five feet six inches (165 centimetres). No abnormality can be felt on abdominal palpation.

Discussion.

Usually symptoms and signs of this condition first appear in childhood or early adult life. In one series of proved cases 80% of the patients were aged under twenty-five years and in adults the symptoms may date back for years. The condition is more common in females than in males, in the proportion of four to one; the reason for this is not known. The typical picture, therefore, is that of a young girl or woman suffering from jaundice, with probably some abdominal pain, and having a rounded cystic tumour in the right upper quadrant of the abdomen.

The ætiology of the condition is obscure. The onset of symptoms in childhood or early life suggests a congenital origin, and most authors accept this. It is to be noted that the lesion represents a localized dilatation of part of the biliary system only—namely, the supraduodenal segment of the common bile duct. This state of affairs differs from what occurs when the lower end of the common bile duct is blocked or compressed by tumour or stone, for then the whole biliary tract becomes dilated. Yotuyanagi postulates two essentials: (*a*) a primary cystic dilatation of the common bile duct of some extent, (*b*) a narrowing of the terminal part of the duct. This narrowing of the duct may be in part due to further increase of the primary dilatation as a result of bile stagnation, causing stretching or kinking below the dilatation. Poate argues that if the atresia was truly congenital, symptoms should in all cases be present within a few months of birth, whereas this is not so in the majority of cases.

Treatment.

Medical treatment invariably ends fatally. External drainage alone leads to virtually the same result. Excision of the cyst with reconstruction of the bile duct has been successfully practised on occasions; it must, however, rarely be feasible and always risky. There remains then anastomosis of the cyst to the alimentary tract, and this is the treatment of choice. In Zinniger and Cash's series of 105 cases anastomosis of the cyst to the alimentary tract, with or without preliminary drainage, was carried out in 44 cases, in which there were 31 recoveries. In Poate's series of 23 patients, of 12 so treated, 10 recovered.

Anastomosis of the cyst to the stomach is said to be a bad operation, because of the risk of gastric contents entering the cyst and setting up cholangitis. Probably this complication is most likely to occur comparatively soon after the operation, before the cyst has had time to shrink. In the case under discussion, pyloric obstruction due to retraction of the anastomosis nearly proved fatal, and this possibility, combined with the risk of regurgitation of stomach contents into the biliary passages, seems to render choledocho-gastrostomy an undesirable procedure. Anastomosis of the cyst to the adjacent duodenum is the operation which has been most used, and has given good results. However, when the cyst is unduly large and the duodenum has been much displaced, it is possible that obstruction may arise from retraction of the anastomosis, just as it did in the case under discussion. Hence the safest procedure is probably that recommended by Maingot, in which the cyst is short-circuited into the proximal part of the jejunum, two or three feet from the duodeno-jejunal flexure. This latter type of operation gives excellent results when carried out to relieve jaundice in inoperable carcinoma of the head of the pancreas.

Finally, in the treatment of seriously ill patients like the one in the present case, particularly when the cyst contents are infected, preliminary external drainage, followed later by implantation of the fistula into the jejunum, may be the safest procedure.

Summary.

1. A case of congenital cystic dilatation of the common bile duct is presented, treated by anastomosis of the cyst to the pyloric end of the stomach. Two serious post-operative complications developed—namely, acute hæmorrhagic entero-colitis and pyloric obstruction. The latter required a posterior gastro-jejunostomy to relieve it.

2. The ætiology and treatment of the condition are briefly discussed.

References.

Maingot, R. (1948), "Abdominal Operations", Second Edition, page 572.

Poate, H. R. G. (1941), "Congenital Cystic Dilatation of the Common Bile Duct", *The Australian and New Zealand Journal of Surgery*, Volume XI, page 32.

Yotuyanagi, S. (1939), "Contributions to the Ætiology and Pathogeny of Idiopathic Cystic Dilatation of the Common Bile-Duct, with Report of 3 Cases; New Ætiological Theory Based on Supposed Unequal Epithelial Proliferation at Stage of Physiological Epithelial Occlusion of Primitive Choledochus", *Gann*, Volume XXX, page 601.

Zinniger, M. M., and Cash, J. R. (1932), "Congenital Cystic Dilatation of the Common Bile Duct, Report of Case and Review of Literature", *Archives of Surgery*, Volume XXIV, page 77.

Reviews.

WARTIME WOUNDS OF THE EXTREMITIES.

"WOUNDS OF THE EXTREMITIES IN MILITARY SURGERY", by Oscar P. Hampton, junior, sets forth lessons that have been learned by contemporary surgeons and, no doubt, will have to be relearned by future surgeons.[1]

Colonel Bowers, in the foreword, states that there have been few monographs on this subject, although hundreds of papers have been published. This, of course, is only natural because a monograph takes time in the preparation and is often outmoded whilst the printer's ink is still wet. However, in this treatise, Hampton rectifies this position by presenting again the basic principles of military surgery as may be seen in initial and reparative surgery.

After a chapter on some general considerations such as a description of the line of evacuation of the wounded, the effect of missiles on the human body, wound healing, chemotherapy and antibiotic therapy, the casualty is then followed back along the lines of evacuation to the general hospital level. Special types of injury are discussed, namely, nerve and vascular injuries, compound fractures, joint wounds and amputations. Regional injuries are thoroughly detailed, including a chapter on wounds of the hand. Burns, trench foot and anaerobic wound infections, including gas gangrene, anaerobic cellulitis and tetanus, each have a chapter of their own.

First-aid measures to be applied in the front line are described. Initial wound surgery or excisional surgery as carried out in forward hospitals as soon as possible after wounding is well detailed. Methods of splinting, including the Tobruk splint, employed in the transport of casualties back to the next unit, the general hospital, are well described and illustrated. The casualty thus arrives at the general hospital with his wound excised but unsutured. Reparative surgery is now undertaken, preferably three to six days after wounding. This reparative surgery includes further surgical excision if necessary, reduction of fractures and delayed surgical repair which may include delayed primary

[1] "Wounds of the Extremities in Military Surgery", by Oscar P. Hampton, jnr., M.D., F.A.C.S.; 1951. St. Louis: The C. V. Mosby Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. 10" x 7", pp. 434, with 131 illustrations. Price: £5 5s.

suture or more intricate plastic surgery including flaps or grafts. Hampton states that with the use of modern antibiotics the indication for delayed suture is the clinical appearance of the wound, namely, a clean, healthy looking wound, no matter what bacterial flora may be present. This statement naturally will not be agreeable to all surgeons.

The next stage of evacuation of the American wounded is to what the United States Army calls the Zone of the Interior where reconstructive surgery is carried out, but this is not dealt with in this book.

The author rightfully eschews primary suture of wounds in military surgery except under very special circumstances, such as in a patient who has a reasonably clean wound and can be observed in the forward unit at least seven days prior to evacuation. He contrasts the modern method of wound excision and delayed primary suture with the Trueta method of wound treatment to the disadvantage of the latter, a statement with which few will disagree.

In his discussion on arterial wounds Hampton sensibly states that in the forward areas repair of main arteries at initial surgery was usually impractical for many reasons. He points out the now well-known fact that if the main artery to a limb is ligated, there is no need to tie the accompanying vein. He discusses traumatic aneurysm, localized arterial spasm and vascular insufficiency. The dangerous hæmorrhage into the posterior compartment of the leg is mentioned.

In the chapter on peripheral nerve injuries, the importance of visualizing the damaged nerve in the wound and leaving it well alone is discussed. A most important thing to do here is to record the injury correctly and adequately to help the surgeon who is to do the final formal nerve surgery at the base installation some three to six weeks later. It is well stressed throughout the book that, important as adequate records are in civil surgery, they are even more important in military surgery, where the patient of necessity goes through the hands of successive surgeons.

In the case of joint wounds, the author decries the use of early formal resection in infected knee and hip joints as was used by French, German and Russian surgeons with such poor results. He advocates careful excision of these joints even if infection has already occurred. He quotes results in such cases which, even if short term, are excellent.

As far as compound fractures are concerned, apart from the orthodox methods of treatment, internal fixation at the first operation of reparative surgery is mentioned in some detail. It is a pity that, occupying the positions he does, no doubt with access to Army and Veteran (Repatriation) medical records, the author gives us no details of reconstructive surgery or methods of rehabilitation. Long-term results of these wounded extremities, especially those which were treated by immediate internal fixation at the time of reparative surgery, would be appreciated greatly. A comparison of the results of these and the more conservative operations would be most interesting and valuable, especially as some British authorities suggest that immediate internal fixation yields a higher rate of delayed union and non-union. It is only by such follow-up investigations that one can judge the value or dangers of different methods.

To sum up, after reading this book one realizes that the principles of the correct treatment of trauma never change; they only have to be relearned.

The book is lavishly illustrated, which may account for the price of five guineas. This will effectively prevent a wide sale to the profession.

"PATTERNS OF MARRIAGE."

THROUGH the neurosis wards of the hospital where the authors of "Patterns of Marriage" worked there passed, between the beginning and the end of the war, over nine thousand soldiers.[1] In that same hospital there were also wards for the treatment of bodily illnesses and injuries where the patients presented a fairly true cross-section of the general average of humanity, had been subjected to the same stresses as had the patients of the neurosis wards, and yet had survived without nervous illness.

The investigation planned was designed to take advantage of the use of these two groups, namely, soldiers who in service conditions fell ill with nervous disorders, and soldiers who were admitted to hospital with symptoms which had no bearing on their mental health. The difference between the reactions of the two groups to service conditions might well help to decide certain typical differences between the natures of those constituting the two groups: the one group is vulnerable and the other tough or resistant; the persons in one group fall ill of a neurosis, while those of the other do not suffer. One subject of special interest to the authors was the possible existence of "assortative mating". What sort of people do men and women choose in marriage? Do neurotic people choose neurotic people for their husbands and wives? If they do, it would be "a factor of prime importance in judging the constitutional background of neurosis, and one that would have to be taken into account in planning a population policy for the nation". In fact, the hospital itself provided a good cross-section of the general average of humanity when subject to the stress of war.

The plan now was to take the opportunity to study and compare the two groups. Did, for example, neurotics tend to choose neurotics for their mates? This is the question of "assortative mating". Or, again, the relative fertility of neurotics when compared with that of normal people: in fact, as a result of this different fertility, the average intelligence of the nation is dropping seriously from generation to generation.

In this way, the two groups were used to make other investigations into social phenomena which depended upon the possession of intelligence by the two groups. "Patterns of Marriage" records the results of many of these investigations.

[1] "Patterns of Marriage: A Study of Marriage Relationships in the Urban and Working Classes", by Eliot Slater, M.A., M.D., F.R.C.P., and Moya Woodside; 1951. London: Cassell and Company, Limited. 8½" × 6", pp. 312,. Price: 17s. 6d.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The Medical Clinics of North America"; 1952. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Chicago Number. 9" × 6", pp. 310, with 28 illustrations. Price: £7 5s. per clinic year in cloth binding and £6 per clinic year in paper binding.

This is a Chicago number, and comprises a symposium on recent advances in cardio-vascular diseases, as well as five articles on other subjects. The symposium consists of 16 contributions. There are 25 contributors to the whole number.

"The Surgical Clinics of North America"; 1952. Philadelphia and London: W. B. Saunders Company. Melbourne: W. Ramsay (Surgical) Proprietary, Limited. Chicago Number. 9" × 6", pp. 354, with 139 illustrations. Price: £7 5s. per clinic year in cloth binding and £6 per clinic year in paper binding.

This is a Chicago number and comprises a symposium on recent advances in surgery. There are 26 articles by 44 different contributors.

"Atlas of Gynecologic Pathology: Color Film Library and Descriptive Manual", by Anthony V. Postoloff, M.D., and David H. Nichols, M.D.; 1952. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9½" × 5", pp. 84. Price: £43 with 100 Kodachrome slides.

The slides, which number one hundred, depict both macroscopic and microscopic gynæcological lesions.

"The 1951 Year Book of Urology (November, 1950-October, 1951)", edited by William Wallace Scott, M.D., Ph.D.; 1952. Chicago: The Year Book Publishers, Incorporated. 8" × 5½", pp. 384, with 84 illustrations. Price: $5.50.

One of the "Practical Medicine Series of Year Books".

"Gypsona Technique: A Handbook to the Functional Treatment of Fractures, with Sections on Plaster Treatment of Tuberculous Conditions, Soft-tissue Injuries, Burns, etc."; Eighth Edition; 1950. Hull: T. J. Smith and Nephew, Limited. 8½" × 6", pp. 106, with 140 illustrations.

The first edition was published in 1935.

"A Technique of Compression Bandaging"; 1951. Hull: T. J. Smith and Nephew, Limited; Sydney: Smith and Nephew (Australia) Proprietary, Limited. 9" × 5½", pp. 60, with 100 illustrations. Available on request.

Deals with the technique of the use of "Elastoplast" bandages.

The Medical Journal of Australia

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All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

A REPORT ON MEDICAL EDUCATION.

"OUR duty is not to see what lies dimly at a distance, but to do what lies clearly at hand." With these words Dr. V. M. Coppleson, Honorary Director of Post-Graduate Medical Studies in the University of Sydney, concludes a report on trends in modern medical education. This report, which constitutes the November, 1951, issue of the *Bulletin of the Post-Graduate Committee in Medicine, University of Sydney*, bears the subtitle: "A Report on the Development of Graduate and Post Graduate Medical Education at Home and Abroad." The author states that his inquiries extended to the United States of America, Canada, England and Scotland, and that he visited many organizations and institutions in these countries. We may state at once that this is an important and interesting document. It should receive the careful attention of every medical teacher in Australia, and indeed of every practitioner interested in medical education. It is not particularly easy to read, being somewhat diffuse and at times verbose, but in defence of this it may be pleaded that the subject is difficult and covers a great deal of ground.

The report is divided into two parts. The first part deals with the many changes and recent trends abroad in medical education, with particular reference to the changes in graduate and post-graduate medical education.[1] With much of the detail in this part the average reader will not concern himself—it will be studied in detail by those more immediately concerned in medical education. One or two facts, however, should be mentioned. It is pointed out that the promotion of medical education, whether undergraduate or post-graduate, not only rests upon the fundamentals of care of the patient, teaching and training, but must include research. This is generally accepted throughout the United States and the United Kingdom. The author remarks that preoccupation with research is one of the most impressive features of present-day medical education in the United States. Research is supported by governments, by foundations, by public and private bodies, and by individuals, and it "has been woven into the fabric of teaching". "The organization of university departments, staffing and construction of hospitals are largely planned with this object, and student and graduate teaching is so arranged as to support research programmes." If the author means that research is taught and superintended by teachers, heads of departments, actually working at the bench or bedside, nothing could be more desirable. Ability in research cannot be acquired without inspiration, and inspiration can never be given by control; it must have its origin in the example, in the actual work, of an enthusiast. The governing bodies of universities do not always realize this when they are making appointments to medical teaching positions. The result of such failure can only be mediocrity. The author writes that in Great Britain research, so far as it is associated with graduate education, is developing on lines that are somewhat different from those of the United States. The same facilities or opportunities for young graduates are not available, while the finance provided and the space allotted for research in many of the teaching hospitals are much less. At present there is no close link of education with research at the senior registrar stage, except at a few hospitals, but this matter is receiving attention. He holds that men, particularly at the senior registrar resident stage, should provide the basic personnel for research. The whole plan of teaching and training should be integrated with opportunities for research and should not be interfered with by rigid requirements for degrees or diplomas or by examinations. The second aspect in the first part of this report to which we would draw attention has to do with the control of graduate and post-graduate medical education. This is not entirely in the hands of the universities; the standards are largely determined in Great Britain by the Royal Colleges, and in the United States by the American boards. In the United States this has evoked strong criticism, and Dr. Alan Gregg, of the Rockefeller Foundation, an authority on medical education, holds the view that the universities should be in complete control of graduate medical education. This, our author states, is debatable. He thinks that although it may have swung too far, the present trend of graduate education by boards and colleges is understandable. The impulse for graduate education has come from the boards and colleges and not from the universities. What has been a major interest to the boards and colleges has been a minor one to the faculties of medicine of the universities. The faculties are unable to match the skill of the boards and colleges in determining professional requirements or the standard of professional examinations. If the universities wish to advance in this matter, they will need to establish new organizations with a better understanding of the problems of graduate and post-graduate medicine. We read that on the other hand, the scientific method which should be the basis of graduate medical education is the special field of universities. Boards and colleges are not educational institutions; they have not the resources or the experience of the universities, and they can never hope to provide education and

[1] Throughout the report "graduate training" refers to training of specialists and "post-graduate education" refers to the education of the general practitioner.

training of university standard. "Post-graduate medical education obviously must be a compromise between the academic requirements of the universities and the professional requirements of colleges and boards."

Turning to the second part of this report, we find much to interest us. There is a good deal of discussion on internships in New South Wales. In New South Wales, according to the *Medical Practitioners Act*, 1938, every student on graduation in medicine is supposed to spend a year as the resident medical officer of a hospital before he can be registered. This provision is not at present being enforced. The author has a good deal to say about the number of students graduating in medicine. At the beginning of 1952, at least 305 students were expected to graduate. The number for 1953 is expected to be 296, and it is estimated that the figure will remain at about 200 until 1960, when a progressive increase may be expected. Sixty-seven hospitals in New South Wales, we are told, take 242 interns. About 50 or 60 of these are non-resident. Thirty of the hospitals have a daily bed average of over 100, and this group takes 178 interns. We are told that of these 30 hospitals, probably not more than 20 would conform to the standards for intern training laid down by the Council on Medical Education and Hospitals of the American Medical Association. The remaining 37 hospitals take 63 resident medical officers. The staffs of most of them consist of general practitioners. A statement which will probably cause some resentment is that in few, if any, hospitals in New South Wales is there any attempt at intern training. We are told that the problem is not, at present, being taken in New South Wales as an educational problem, and that hospitals too small and totally unsuitable educationally to take interns are being persuaded and even assisted to do so. Destructive criticism of this kind is easy to make. The unfortunate position in medical education in New South Wales is that the University of Sydney has no power to limit the numbers of students who wish to study medicine. In some of the best universities of the world, no more than a certain number of undergraduates are admitted to the medical school, and overcrowding cannot take place. Those who have studied the subject know that the establishment of new universities in Australia is long overdue. At least one more university is needed in Victoria and in New South Wales—not a sawn-off university college where an overflow from one or two faculties may be sent, but a separate university complete in every respect with all the faculties needed. We all know, too, that it is high time that a medical school was added to the University of Western Australia. Until this happens it is difficult to see how much improvement can be effected in New South Wales. However, the author suggests that an investigator should be appointed by the Post-Graduate Committee to inspect every hospital in New South Wales offering intern appointments, but particularly to determine the efficiency of the country and suburban hospitals as training centres. Let us suppose that this was done and that our investigator reported that the hospitals in towns X, Y and Z which were employing resident medical officers on graduation, were not suitably staffed and equipped. What would be done? We know that nothing whatever would be done, or for that matter, could be done. When we read that hospitals too small and totally unsuitable educationally to take interns are being persuaded and even assisted to do so, we feel bound to ask whether it is not better for a young graduate to enter as resident medical officer in a hospital staffed by general practitioners than to go into private practice without any such experience. The placing of recent graduates in resident appointments in hospitals is undertaken every year by a committee of the New South Wales Branch of the British Medical Association, and many hospitals, which would not previously have employed resident officers, have agreed to do so. Half a loaf is certainly better than no bread, and until we have more hospitals or fewer undergraduate students in medicine, we shall have to be content, in many instances, with half a loaf. Our author would like to see the development in the teaching hospitals of units of medicine, surgery and pathology. These units, we are told, should be staffed by men chosen for their ability, their academic qualities and their contributions to medicine, and graduate training in research should be among their chief responsibilities. With this we agree, but we do not agree with the implication of the sentence which follows: "At present, the teaching hospitals are concerned more with the management and care of patients than with teaching." We are quite certain that our author does not mean what the sentence implies, for the patient always is, and must remain, the chief consideration in the curative practice of medicine. It is unthinkable that any member of the staff of one of our teaching hospitals should, for example, withhold urgently needed treatment from a patient who is gravely ill, for a period of, say, half an hour, in order that the patient's condition might be demonstrated to a group of students. It is not quite clear what is meant by the statement that there is particular need "to introduce sounder methods of graduate training, both for general practice and for specialization, which should be integrated with the undergraduate course, coordinated with other forms of medical education, and related to research". We agree that an atmosphere of scientific purpose, rather than one of vocational endeavour, should pervade all branches of the school. It may be that the author had this in mind when he wrote earlier in the report that medical education in the University of Sydney needs a new philosophy. It would be excellent if, as is suggested, members of university departments and the teaching staffs of hospitals could be given every opportunity to visit and to work in other departments and hospitals in an organized system of exchange with other schools and universities at home and abroad. Readers may possibly remember that some months ago reference was made in these columns to the establishment in Edinburgh of a general practice teaching unit. Our author advocates the establishment of "experimental residencies" in general practice at certain centres. It is to be hoped that this will happen some day. In regard to the Royal Colleges in Australia, provocative views are expressed. It is pointed out that The Royal Australasian College of Physicians has adopted a policy of decentralization, and that its examinations are conducted so that they cause the minimum of travel and inconvenience to candidates. The Royal Australasian College of Surgeons, on the other hand, has adopted a policy of centralization. The effect of this policy, as judged in New South Wales, would appear to be "acting to the great disadvantage of its candidates and to the detriment of the development of

surgical graduate education in the State". The author holds that examinations for college diplomas should be held in each capital city. Presumably, under this scheme such examinations would have to be held every year. We question whether this is necessary or desirable, and again, it would cost a great deal of money and would involve the examiners in much loss of time. The recommendation may be quoted in full: "A common scheme is wanted which will encourage higher medical education in each State, co-ordinate and simplify the degrees and diplomas of the Australian universities and colleges, provide training appointments of suitable standard in the Australian hospitals, make provision for research, and make available the educational facilities and examinations for the College and professional diplomas in each capital city." The author holds that in graduate medical education a false scent is being followed. The acquisition of diplomas has become the highest goal, and instead of through the hospitals, the university and the research laboratory, the path of higher medical education is being blazed through the classroom and examination hall.

The first step which is suggested to bring about the necessary changes is the acceptance by the universities of the principle of the division of medical education into an undergraduate educational phase and a post-graduate vocational phase, with acceptance of responsibility for both. It is also suggested that the present post-graduate bodies of the universities should be improved in status: (i) They should be strengthened, supported and specially adapted for the purpose. (ii) They should be allied to and closely associated with the faculties of medicine and the university departments, but not controlled by the faculties. (iii) They should give representation to all other bodies entitled to a voice in graduate medical education in their State. (iv) They should also be the same bodies which undertake post-graduate medical education for the general community throughout the State. The author would like to see established an Australian Academy or Institute of Medical Education "which would provide the necessary machinery for all university and other bodies interested in medical education to review publicly, at least once a year, medical education in Australia". The view is expressed that such a body is beyond the scope and purpose of the British Medical Association in Australia. It is thought that such a body should be established on a national scale under the direction of either the National University or the National Health and Medical Research Council. Its headquarters, its secretariat and its meetings should be in Canberra. Readers will realize that this report is a forthright and dogmatic document. It is hoped that on this account readers interested in the subject will not pass it by. It is easier to be destructive than to give expression to constructive views. Medical knowledge and the environment in which those who acquire it must use their knowledge, are not, and never will be, static. It will always, therefore, be possible to give expression to destructive criticism, but it will always be possible also for students of the subject to be constructive. The Federal Council of the British Medical Association in Australia has in mind the setting up of an inquiry into medical education in this country. This report may well serve as one of the works of reference for the committee which will make the inquiry.

Current Comment.

CHEMOTHERAPY OF TUBERCULOSIS.

THE discovery of the sulphonamides and the mould antibiotics and of their success in the treatment of many bacterial infections has increased interest in the possibility of chemotherapeutic treatment of tuberculosis. Sir Howard Florey has discussed the properties necessary in substances which might be useful in tuberculous infections, in the Walter Ernest Dixon Memorial Lecture.[1]

New antibacterial substances are tested for their ability to inhibit the growth of chosen bacteria or fungi *in vitro* and then for their toxicity to animals and ability to inhibit the development of artificial infection in animals. If these are satisfactory the carefully purified substance is tried against infections in man. The concentration of the antibacterial substance attained and maintained in the blood after parenteral or oral administration has been taken as an indication of the concentration reached in normal body fluids. There is an assumption here that the antibiotics of small molecular size, such as penicillin and streptomycin, pass freely to and fro through the walls of normal blood capillaries. This is probably true but by no means certain.

Inflamed vessels in lesions caused by pyogenic infections become more permeable. The causative organisms of the pyogenic infections are, for the most part, free in the tissue fluids; few are taken up by granulocytes in the non-immune animal. The action of penicillin, terramycin and aureomycin has been shown to be a direct killing of dividing organisms, not a preparation of the organisms for phagocytosis. This is what occurs during the chemotherapy of an acute infection when there is little or no tissue destruction. When there is tissue destruction with the formation of pus the picture is different. The more chronic the infection, the greater the difficulty of removing the infecting bacteria. This is well illustrated in osteomyelitis caused by the staphylococcus. If pus is present it must be evacuated, if sequestra are present they must be removed surgically before penicillin will act as a sterilizer. Now in tuberculous infections the bacteria are quickly taken up by mononuclear cells and grow within the cells. With the growth of the reaction more and more mononuclear cells appear and assume the somewhat specific form of epithelioid cells. At this stage it is probable that most of the tubercle bacilli are intracellular. With the growth of the tubercle, necrosis or caseation in the centre of the lesion occurs. No blood vessels penetrate the caseous areas, although the vessels on the periphery of the tubercle are dilated. Drugs in the blood-stream will then have to penetrate considerable distances through necrotic and densely cellular tissue to reach the bacilli which are often present in large numbers in caseous material, and they must, if they are to be effective, be able to enter macrophages and epithelioid cells containing bacilli and build up within the tissue cells a concentration sufficient to kill the bacilli. In the earliest stages of tuberculous infection in man which can be detected clinically these processes have advanced considerably. It does not follow then that a drug which is very active against tubercle bacili *in vitro* will have any appreciable effect *in vivo*. Easily diffusible substances of small molecular size might be satisfactory, but another possibility exists, and that is to use substances of relatively large molecular size or substances firmly bound to large molecules which do not diffuse readily from normal blood vessels, but could be made to enter tubercles somewhat selectively by their capacity to pass through the walls of capillaries whose permeability is increased. To give any hope of usefulness such a substance should be able to inhibit the growth of tubercle bacilli *in vitro* in great dilution, should be bactericidal rather than bacteriostatic, should be able to penetrate the walls of macrophages and,

[1] *Proceedings of the Royal Society of Medicine*, February, 1952.

possibly, epithelioid cells, and should be concentrated in these cells in the manner of a vital dye. As the substance would be taken up by reticulo-endothelial cells and remain in the tissues, particularly liver and spleen, for a long time, it must have low toxicity for tissue cells. No such substance is yet known. Micrococcin, an antibiotic obtained from sewage micrococcus, seemed to have some of these properties. It is almost insoluble in water, inhibits staphylococcus and streptococcus *in vitro* in dilution of 1 in 30,000,000, but is much less active on the tubercle bacillus. It is taken up by reticulo-endothelial cells and macrophages and is relatively non-toxic. When injected intravenously into animals infected with tuberculosis it remained in the blood vessels in large aggregates with blood platelets and did not pass into the tubercles excepting where a blood vessel containing it was necrosed, and even then had no effect on the growth of the bacilli. It is to be remembered that tuberculous lesions in man are essentially chronic for the most part. Streptomycin, which is active in acute lesions, is little active in chronic lesions. For example, tuberculous abscesses in guinea-pigs were not sterilized even after the uninterrupted administration of streptomycin for 528 days. When the abscesses were drained healing sometimes occurred. One conclusion can be drawn from these considerations, and that is that any form of treatment should take place at the earliest possible moment after infection.

BEJEL.

IN Arabia there occurs a disease called *bejel*. It is a chronic, systemic, infectious disease, caused by a spirochæte that is said to be identical with the causal organism of syphilis. The blood of sufferers from *bejel* reacts to the Wassermann test. The disease is more benign than syphilis of the western world. It is a household disease, spread by contact among the members of a family. It is not commonly transmitted by venereal contact. Some observers have remarked on the absence of a primary lesion.

The place of *bejel* in the classification of spirochætal diseases has been the subject of controversy. Most observers regard it as syphilis modified by its mode of transmission or by the lower virulence of the causal organism. But some regard it as a separate disease, and a few, who believe in the unity of frambœsia and syphilis, regard it as the link between these two diseases. The views of some observers have been influenced by the alleged absence of a primary lesion. Indeed this is a feature that has puzzled those who believe that *bejel* is syphilis. But F. Akrawi,[1] who has made extensive studies of *bejel*, points out that recent investigations in Chicago have shown that many children living in overcrowded and unhygienic conditions may acquire syphilis without a primary sore. However, the main object of Akrawi's paper is to show that in rare cases the primary lesion does appear in *bejel*. He has heard of one case in the valley of the Euphrates. The patient was a woman who had suckled a Bedouin infant infected with *bejel*. She acquired a chancre of the breast. In addition Akrawi has recently seen two other cases. In one, the patient was a man who apparently had been infected by his wife. He had two primary sores in the pubic region accompanied by buboes. *Treponema pallidum* was found in the discharge from the lesions. Seven other persons lived in this man's household. Each of them suffered from various muco-cutaneous lesions discharging *Treponema pallidum*.

Akrawi's second patient was a woman who suffered from sores of each breast and axillary adenitis. The lesions were found to be discharging *Treponema pallidum*. The woman's husband and one of her three children were free of the disease. The other two children, one of whom was a baby, had lesions of *bejel* in the mouth. Akrawi concludes that the woman was infected by her baby.

Akrawi asks why it is that primary lesions are so rare in *bejel*. He suggests that "massive infection" is required to produce a chancre. In one of his cases this "massive infection" was transmitted by coitus, in the other by repeated feeding at the breast by an infant suffering from oral lesions. "Why bejel does not normally cause a chancre when transmitted freely in nature from child to child can, we think, be explained by the absence of conditions of massive infection like those of venereal syphilis on the one hand, and repeated minimal infections that occur daily in the life of these children under the normal ways of non-venereal transmission of endemic syphilis (bejel) on the other."

Akrawi presents an argument in favour of the syphilitic nature of *bejel*. It might have been stronger if he had given a more accurate description of the lesions that he regards as chancres. He does not say whether they were hard sores, although he describes the adenitis as "primary inguinal adenitis" in the one case and "typical primary adenitis" in the other. But whether he is correct or not, he has done a service in recalling to our attention the existence of this remarkable disease, which is of special interest to the clinician and the medical historian. It would be of interest to study the clinical manifestations of this disease in comparison with the descriptions of European syphilis of the Middle Ages.

[1] *Transactions of the Royal Society of Tropical Medicine and Hygiene*, January, 1952.

ACUTE TRAUMATIC AND TOXIC RENAL FAILURE.

ACUTE failure of the kidneys with death can be related to many kinds of trauma—crushing, burns, obstetrical complications, surgical shock *et cetera*—and several different poisons such as sulphonamides, mercuric chloride, carbon tetrachloride, potassium chlorate and fungous poisons. Both the traumatic and the toxic types have been much studied, but without the appearance of a clear picture of the pathological changes and the reasons for these changes and the differences and similarities of the two types. The traumatic type has been called "lower nephron nephrosis" and sharply differentiated from the toxic type in which degenerative changes take place mainly in the proximal tubules.

Over the past ten years Jean Oliver, Muriel Macdowell and Ann Tracy[1] have been studying kidneys from cases of acute failure from trauma and poisons from a wide source using very special technique. Small blocks of the formalin-fixed kidney are macerated in concentrated hydrochloric acid at room temperature until they are quite soft. The macerated tissue is thoroughly washed and the nephrons are dissected out in water under a binocular microscope. Individual nephrons are separated and mounted on a slide, stained with iron hæmatoxylin and, after differentiation, mounted in water for microscopic examination. Very many overlapping photomicrographs are taken along the length of the nephron. These are then combined and give a picture of the entire nephron or a large part of it. The cellular structure of the tubular epithelium is quite well preserved. The great advantage of this method over ordinary histological examinations for this kind of study is that the nephron can be studied in its length and the site and extent of degenerative processes followed very much more clearly than in cross-sections. The term "lower nephron nephrosis" can no longer be used to describe the condition following trauma, for the lesions of the kidney are not peculiar to nor localized in any part of the nephron. The common structural lesion of all members of the group of acute renal failure is tubular damage. There are two quite different kinds of tubular damage. One kind is the well-known nephrotoxic lesion which results when some poison in the blood-stream is distributed evenly and equally to every nephron. This change takes place in the proximal tubules; the epithelial cells in other parts of the nephron

[1] *The Journal of Clinical Investigation*, December, 1951.

are unaltered. The other kind of tubular lesion is distributed in entirely random fashion in the kidneys; some nephrons, often in groups, are involved, others are free of it. Within the nephron any portion may be the seat of damage from the glomerulus to the collecting tubule. Generally only short stretches of the nephron are affected. In these areas the entire tubular wall is affected, including the basement membrane, which may be broken or almost disappeared. The whole section of the tubule is dead. The authors call this tubular disruption or the tubulorhexic lesion. The nephrotoxic lesion is due to the absorption and concentration of the poison by the epithelial cells of the proximal tubules with more or less necrosis of the epithelial cells, but the basement membrane remains intact and there may be considerable epithelial regeneration if the patient lives long enough. The authors give very strong evidence that the tubulorhexic lesions are due to localized ischæmia in the kidneys which follows shock from any cause. In purely traumatic cases only this type of lesion is seen. In toxic cases in man when the patient lives some days, there are usually severe disturbances in other parts of the body such as the intestines and much shock and one finds both types of lesions in the kidneys.

The conditions may be described in simplified form as follows: (i) Crushing injury—shock—renal ischæmia—random disruptive tubular damage—anuria—uræmia—death. (ii) Antifreeze or sublimate intoxication—diffuse nephrotoxic proximal damage—dehydration—potassium poisoning, enteritis, diarrhœa—circulatory collapse—renal ischæmia—random disruptive tubular lesions—anuria—uræmia—death. (iii) Moderate poisoning—diffuse nephrotoxic proximal damage—oliguria or temporary anuria—regeneration—recovery.

The unifying element in the heterogeneous complex, acute renal failure, is renal ischæmia, for, under whatever clinical circumstances, renal ischæmia may develop there, the disruptive tubular lesions, either alone or mixed with the effect of antecedent toxic damage, are found along with the functional disturbances of oliguria or anuria, and all the consequent tubular dysfunctions that are revealed by clearance techniques. We have then not a "renal disease" but a circulatory episode which may complicate any clinical situation. The authors call it an ischæmuric episode.

The relation of the lesions to oliguria and anuria is discussed at some length and it is concluded that there are many factors concerned. One important factor may be that the filtrate from the glomeruli passes through the holes produced in the tubules into the interstitial tissue, and so by removal of fluid from the tubules, increased pressure on the tubules and reduction of filtration by the capillaries there is little or no fluid to pass from the tubules to the ureter.

PERNICIOUS ANÆMIA AND POLYCYTHÆMIA OCCURRING IN THE SAME PATIENT.

IN October, 1936, G. A. Birnie, writing from the Alfred Hospital, Melbourne, reported in this journal a case of alternating pernicious anæmia and polycythæmia. The patient was a man, sixty-seven years of age, who came to the Alfred Hospital suffering from a condition which was typical of pernicious anæmia. When he was treated with liver, his condition rapidly improved and he was sent home with instructions to continue taking the liver daily. He returned some months later complaining of increasing weakness, breathlessness and loss of weight. He had a high colour and his mucous membranes had a deep red tint. His blood picture now was typical of polycythæmia. He was treated with phenylhydrazine hydrochloride and soon manifested improvement. He again returned to his home in the country and about 12 months after his first appearance at the Alfred Hospital returned with a blood picture of pernicious anæmia. Two interesting reports of the same kind of case have recently been made.

J. Galt, R. B. Hunter and J. M. Hill, writing from the Baylor University Hospital, Dallas, Texas,[1] report the illness of a white woman, aged sixty-three years. In April, 1947, this woman had undergone panhysterectomy for adenocarcinoma of the body of the uterus. No clinical signs of recurrence were found when she came on August 1, 1950, complaining of weakness. A diagnosis of pernicious anæmia was made. The findings are set out in detail, both on examination of the blood and on examination of the sternal marrow. Treatment with vitamin B_{12} and with liver extract was instituted, and by the end of August a complete remission had occurred. Anti-anæmic therapy was continued until October 17. On January 24, 1951, the condition had completely changed and the picture was now one of polycythæmia. The second case is reported by Arne P. Skouby, from the Copenhagen County Hospital, Hellerup, Denmark.[2] The patient was a woman, seventy-two years of age. The history was something like that of the previous case. The blood picture and that of the bone marrow were typical of pernicious anæmia. After one month's treatment the hæmoglobin percentage and the colour index were normal and the patient felt well. After treatment had been stopped for one month, a picture of polycythæmia developed and the patient's mucous membrane developed a blue colour.

This condition is extremely rare and of great interest. Birnie could give no explanation of the condition which he found, but he pointed out that when phenylhydrazine hydrochloride was used in the treatment of polycythæmia the supervention of an anæmia of the pernicious type was not unknown if excessive dosage was given. He pointed out that that could not apply in his instance. He added that the literature gave no example of an overproduction of the active principle as a result of liver administration, though this had been shown to be in excess in polycythæmia. Galt and his co-workers state that a slightly excessive erythrocytic response may occur as a consequence of adequate therapy in pernicious anæmia, but that the development of polycythæmia in a patient being treated for pernicious anæmia is distinctly uncommon. They regard the case reported by Birnie as the best example available in the literature. They think that the statistical probability of the two diseases occurring in one patient, however slight, must be recognized. They state that it has been suggested in a personal communication by W. B. Castle that when the two conditions do coexist, the basic stimulus for medullary overproduction prevailing in polycythæmia is present, but that the nutrient factor involved in clinically established pernicious anæmia would hinder any polycythæmic response. Only upon administration of the missing anti-anæmic factor could the polycythæmia emerge. Galt *et alii* state that some investigators have developed a theory that primary polycythæmia is the antithesis of pernicious anæmia, the overproduction of cells being due to the excessive formation of hæmatopoietic factors. They state that experimental attempts to demonstrate this have not been convincing. Skouby states that the findings in his case indicate simultaneous occurrence of a predisposition to polycythæmia and pernicious anæmia, and he adds that this seemed to be the case with the patient described by Birnie, who had an enlarged spleen when he was first seen. After further discussion, Skouby states that it is reasonable to assume that the treatment of this patient did not produce polycythæmia, but that it exposed a latent polycythæmia, marked by the anæmia, and perhaps stimulated by the long-standing hypoxæmia. Skouby's concluding assumption is that the two diseases are sometimes, if not always, due to disturbances in two different regulating systems. If this was true, it would be reasonable to expect that cases such as those here discussed would be more numerous.

[1] *The American Journal of the Medical Sciences*, January, 1952.

[2] *Acta medica Scandinavica*, Volume CXLI, Number 4, 1952.

Abstracts from Medical Literature.

OPHTHALMOLOGY.

Action of Cortisone on Tissue Reactions.

SIR S. DUKE-ELDER AND NORMAN ASHTON (*The British Journal of Ophthalmology*, November, 1951) review the literature relating to the action of cortisone on capillary permeability, inflammatory exudation, cellular infiltration and formation of granulation tissue, the formation of connective tissue, new vessel formation, and epithelial and endothelial regeneration. They state that it would appear that cortisone has no influence on the permeability of the normal capillary, but that it appears to be able to reduce to normal the increased permeability characteristic of inflammation. This decrease in permeability would inhibit the exudative manifestations of inflammation and interfere with the demand of fibroblastic and other reparative activities for increased nutritional supply. All experimental work points to the conclusion that cortisone inhibits the cellular infiltration associated with inflammation and also the formation of granulation tissue in the healing process in the eye. The authors also found that cortisone inhibited fibroblastic activity in the cornea, but that the degree of inhibition was related to the amount of cortisone given. With moderate doses adequate healing took place, and it is considered that ocular operations can be safely conducted while the patient is under treatment with cortisone. With respect to the action of cortisone on new vessel formation it is believed that in cases of reaction of reasonable intensity, the vascularization effect habitually exerted by insults such as burns can be controlled by cortisone administered either locally or systemically. Epithelial regeneration may be retarded if the dose of cortisone is large, but when small doses are used epithelial regeneration of cornea is not significantly retarded. No definite conclusions can be drawn as to its effect on endothelial regeneration, but there is some evidence that endothelial regeneration is decreased.

Retinal Detachment and Aphakia.

CHARLES L. SCHEPENS (*Archives of Ophthalmology*, January, 1951) analyses findings and discusses results in 88 cases of detachment and aphakia. He divides detachments in general into three types: one in which detachments are produced by lesions at or near the equator (most associated with myopia belong to this type), a second in which changes occur at the periphery (most detachments associated with aphakia belong to this type), and a third mixed type, in which there are changes at the *ora serrata* and the equator. Poorer prognosis of detachment in eyes with aphakia is probably the result of the difficulty of adequate examination, for the retinal breaks are often small, multiple and located at the extreme periphery. The author considers that aphakic patients are probably affected by subclinical detachment oftener than others. Early the detachment is often flat and smooth and may be present long before the patient is aware of it. However, not all detachments begin insidiously. Another important feature of detachment in aphakic eyes is the occurrence of what is called massive vitreous retraction. The hyaloid membrane in such cases remains adherent to the retina and shrinks, causing a detachment which rapidly becomes total. Aphakic patients under fifty years of age appear more susceptible to vitreous retraction than older persons. There are two principal ophthalmoscopic characteristics of massive vitreous retraction: first, all retinal folds are fixed, so that when the eye moves they remain immobile and do not change in shape or position; second, the fixed retinal folds radiate from the posterior pole of the globe toward the equator. Near the equator and parallel to it, is a circular fixed fold, to which visible vitreous strands are frequently attached. The condition of the eye never improves with bed rest. Although the prognosis is never good when fixed folds are present, it depends on their number, location and extension. In the author's series the total number of aphakic eyes with vitreous retraction was 40 out of 88. Mild degrees of vitreous retraction were observed in 19 eyes. The author states that vitreous retraction is more frequent with detachments of long standing. However, in aphakic as well as in phakic eyes, there is considerable individual variation in the tendency toward development of vitreous retraction. A reason for the development of vitreous retraction in aphakic eyes may be the frequency of changes near the *ora serrata*. These changes probably affect the base of the vitreous. In about 40% of all cases of detachment and aphakia the first symptoms of detachment are noted within one year of the cataract extraction. In 19 of the author's 88 cases the detachment was present before the cataract extraction, and the author has observed several cases of successful operation for detachment followed by cataract requiring extraction. The existence of subclinical detachments leads him to believe that some eyes, classified as being affected by detachment after operation, probably had their detachment before extraction of the lens. The type of operation probably does not influence the appearance of detachment. The greater incidence after intracapsular extraction may result from the general preference of this operation. Some authors think that operative or post-operative complications, such as loss of vitreous, iris prolapse or uveitis, may be responsible for detachment. Of the 72 cases of intracapsular extraction with retinal detachment, vitreous loss occurred in eight, and in none of the 11 cases in which the extracapsular method was used was there loss of vitreous. However, if vitreous was lost the prognosis with respect to a subsequent detachment was poor on account of the massive vitreous retraction which frequently followed. Prolapse of the iris in aphakic patients was a relatively unimportant ætiological factor in detachment. It is pointed out that most authors agree that the prognosis in aphakic detachment is bad. In the author's series 69 eyes were operated upon and reattachment occurred in 39; after elimination of cases of massive vitreous retraction the number increased to 50. Poorer prognosis in aphakic patients resulted chiefly from vitreous traction; another important factor is difficulty encountered in examining the periphery of the fundus, particularly after extracapsular extraction and after discission of the lens in young patients.

Retrolental Fibroplasia.

T. S. SZEWCZYK (*American Journal of Ophthalmology*, December, 1951) states that retrolental fibroplasia is due simply to subclinical anoxia during a period of time when the incompletely developed retina utilizes oxygen at a rapid rate. He found that premature babies who were kept in incubators did not develop the disease. Nine patients with early retrolental fibroplasia were treated by being placed in an atmosphere with a 60% to 70% concentration of oxygen. In all the retina became normal. The disease was induced in seven premature infants simply by removing them from the oxygen incubators, the disease being manifest in twenty-four to forty-eight hours. The process was reversed when the infants were returned to the atmosphere of 60% oxygen concentration.

Partial Transplantation of the Levator Palpebræ Superioris in Superior Rectus Palsy.

H. B. STALLARD (*The British Journal of Ophthalmology*, January, 1952) reports a case of complete paralysis of the superior rectus muscle treated by transplantation of the central third of a normally acting *levator palpebræ superioris*. In the patient so treated the superior rectus had been paralysed since birth, the eye was deviated downwards and outwards, and there was complete absence of elevation. There was secondary contracture of the inferior rectus. Operation was carried out in two stages. The first was recession of the inferior rectus, recession of the external rectus and resection of the internal rectus. The second consisted of resection of the paralysed superior rectus and transplantation of the central third of the *levator palpebræ superioris* to the upper surface of the resected superior rectus muscle. To correct a small degree of original ptosis and any impairment of elevation of the lid, the medial and lateral thirds of the levator were advanced on to the anterior surface of the tarsal plate.

The Present Status of ACTH and Cortisone in Clinical Ophthalmology.

ALAN C. WOODS (*American Journal of Ophthalmology*, July, 1951) analyses the results of therapy with ACTH and cortisone on 398 patients. He draws the following conclusions: (i) In certain cases of inflammatory conditions of the eye, especially those affecting the cornea, uveal tract and external part of the eye, parenteral administration of ACTH or cortisone, or local administration of cortisone, is followed in a high percentage of cases by dramatic control of the inflammatory and exudative phases of the disease. (ii) In many cases of favourable influence there is a tendency for the inflammation to recur on cessation of treatment. (iii) In certain cases of œdematous and inflammatory conditions, especially secondary glaucoma, inflammation of the retina and optic nerve, œdematous corneal grafts and

probably syphilitic interstitial keratitis, the action of ACTH and cortisone is variable. (iv) In some cases of hæmorrhagic and exudative diseases no consistent therapeutic results have as yet been demonstrated. (v) In cases of degenerative disease, these agents are totally without effect. The author states that the most striking feature in the action of these agents is their dramatically quick effect on acute inflammatory conditions when the tissue reaction is still largely vascular and lymphatic in nature. This is the picture seen in cases of acute non-granulomatous iritis, of scleritis, of allergic reactions of the external eye and lids, of early sclerokeratitis, of interstitial keratitis before the stage of necrosis and of central serous choroiditis. When ocular inflammation is characterized by a heavy cellular infiltration of the tissues and when œdema, vascular dilatation and exudation are secondary to the tissue involvement, the immediate effect of these agents is limited to control of œdema, external inflammation and vitreous exudation. In a few conditions —namely, secondary glaucoma, optic neuritis, interstitial keratitis and early clouding of corneal grafts—the action of these agents may be irregular. With diseases such as Coates's disease, Eales's disease, diabetic retinopathy and malignant exophthalmos, no clear-cut therapeutic effect has been demonstrated. For disease of the conjunctiva, cornea, sclera or anterior ocular segment, the topical use of cortisone appears preferable. For generalized uveitis, choroiditis and disease of the posterior segment, the paracentral use of either ACTH or cortisone is indicated. Used topically the cortisone suspension is diluted 1:4 with saline, and for subconjunctival injection 0·2 to 0·4 millilitre of the usual cortisone suspension is injected. No untoward side effects occur after topical treatment.

OTO-RHINO-LARYNGOLOGY.

Laryngocele.

J. J. O'KEEFE (*Archives of Otolaryngology*, July, 1951) states that an outpouching or cystic dilatation arises from the ventricle of the larynx and ordinarily extends superiorly to the superior border of the thyroid cartilage. This is a persistent or constant anatomical entity, varying greatly in size. A laryngocele has been found to develop in three directions. The internal laryngocele appears within the larynx above the false cord, sometimes extending to the aryepiglottic fold or even to the base of the tongue. Hoarseness accompanies dilatation of the sac. The cyst, if large, may produce obstruction. The second type is the superior external laryngocele, in which the sac has perforated through the thyro-hyoid membrane and appears as a swelling in the neck. The swelling enlarges during coughing or straining and can be emptied by pressure, with a sound of escaping air. The third type is a combined internal and external laryngocele. The development of a laryngocele is basically dependent upon abnormally increased intraglottic pressure. Tumour masses, granulomatous lesions and inflammatory or œdematous swellings may so affect the orifice of the sacculus as to produce the check-valve mechanism necessary for the development of cystic dilatation. Laryngoceles sufficiently large to produce symptoms should be excised. The external type is approached through an external horizontal incision parallel to the ramus of the mandible, with dissection of the sac down through the perforation in the thyro-hyoid membrane and amputation of the stump close to the ventricle. The internal type is approached by way of a thyrotomy somewhat lateral to the midline. The sac is dissected out bluntly, and amputation is accomplished as close to the ventricle as possible. Before excisional surgery is commenced every effort should be made to rule out related conditions, such as papilloma, as possible causes of obstruction. Removal of such conditions may allow for deflation of the cyst.

Lye Burns of the Œsophagus.

RICHARD W. HANCHEL (*Annals of Otology, Rhinology and Laryngology*, March, 1951) discusses present-day methods of treatment of lye burns of the œsophagus. He states that for recent lye burns, the alkali is neutralized by oral administration of 2% acetic acid solution. A Levin tube is inserted at the time of initial treatment to maintain a patent œsophageal lumen and to provide a route for the administration of nourishment. This is left in place until peroral bouginage is commenced, usually in two to four days. Dilatations are carried out daily for one to two weeks, then three times a week for two weeks, then once a week for several months. Should there then be no difficulty in passing a bougie, the patient is advised to return in six months for another barium fluoroscopic examination. With lye burns accompanied by stricture formation, obstructive symptoms may not occur until many years have passed. Malnutrition may be severe and may call for preliminary treatment. Barium fluoroscopic examination and œsophagoscopy are employed to confirm the diagnosis. If a stricture is demonstrated gastrostomy should be performed. A string eight to ten feet long is swallowed by the patient and brought out through the gastrostomy fistula. Retrograde dilatation is then carried out, the ends of the string being tied together and used as a guide for Tucker bougies. Retrograde dilatation, although calling for a gastrostomy, is much the safer method. After the stricture has been dilated up to number 34 or 38F, the string is removed, and peroral dilatations with a mercury-filled bougie are begun. After a short trial the patient may use the mercury bougie once a week at home. In cases in which there is resistance to dilatation or contractures rapidly recur, an operation such as œsophagogastrostomy may be needed.

Surgery in Ménière's Disease.

SAMUEL ROSEN (*Annals of Otology, Rhinology and Laryngology*, September, 1951) states that destructive laryrinthotomy has largely replaced the procedures for intracranial section of the eighth nerve. While these operations are eminently successful in eliminating the attacks of vertigo, they are much less successful in eliminating tinnitus and the sense of fullness or pressure about the ear. After laryrinthotomy the hearing is practically always totally destroyed. The endolabyrinthine hydrops which occurs in Ménière's disease is probably due to some imbalance in the autonomic nervous system which produces a disturbance of the capillary loops of the endolymphatic labyrinth resulting in fluid transudation. Operations on the autonomic system such as cervical sympathectomy and stellate ganglionectomy hold some promise in eliminating capillary spasm. Some vasomotor influences may be transmitted through the *chorda tympani*, and through the tympanic plexus and Jacobson's nerve. Based on this theory an operation has been performed on fourteen patients with signs and symptoms suggesting hydrops of the labyrinth. The operation consists of sectioning of the *chorda tympani* nerve alone or along with the tympanic plexus and Jacobson's nerve. The operation is performed through the external auditory canal; the integument of the floor and the lower half of the tympanic membrane are reflected upwards. Eleven of 14 patients operated on have had no vertigo since operation. Tinnitus was reduced in over half of the cases. In no instance was the hearing destroyed.

Treatment of Ménière's Disease with Streptomycin.

H. V. HANSEN (*Annals of Otology, Rhinology and Laryngology*, September, 1951) states that five patients suffering from severe vertiginous attacks were treated with streptomycin. The condition was in three cases unilateral, in one bilateral and in one of uncertain lateralization. All the patients have been restored to full employment. They were given two grammes of streptomycin daily for thirty-six to thirty-eight days. Function of the affected labyrinth was partly or totally destroyed, while that of the other side remained good. Hearing was not damaged, but was often found to be improved. It is thought that still better results will be obtained by increasing the amount of streptomycin in an attempt to prevent the return of any vestibular function. It is proposed to make the dose three grammes, divided into two doses daily, and to carry on the treatment for five days beyond the period of the loss of cold caloric response in the involved ear. Treatment should be discontinued immediately, however, should the responses become reduced in the uninvolved ear.

Epistaxis and Sinus Infection.

I. J. L. MORRIS (*The Journal of Laryngology and Otology*, September, 1951) presents a study involving 159 patients with a primary complaint of nose bleeding. Of 101 patients of whom X-ray pictures were taken 51 had positive X-ray evidence of sinus infection. The maxillary sinus was the one involved in practically all cases. Of the 51 patients with positive evidence 31 were submitted to antral lavage, and 20 had pus in their antra. In practically all cases in which antral lavage was performed there was no recurrence of epistaxis. Among patients over fifty years of age hypertension was the commonest cause of epistaxis. Sinus infection and hypertension together were found in a number of these patients, so that the author suggests that X-ray examination and possibly antral lavage should always be considered.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

XXIII.

OBSERVATION OF ABDOMINAL PAIN IN CHILDHOOD.

DOUBTLESS, one of the most common symptoms of disease in childhood, abdominal pain, and the conditions responsible for its presence, cause the family medical attendant more anxiety and disquiet than any other symptom. In both infants and children, abdominal pain is an early signal that something is amiss, and it can be either of little moment or of great importance, portending a serious state of abnormal process or processes.

Assessment of Degree of Pain.

In the infant and young child, determination of the site of pain and of its degree of severity can be very difficult, and is dependent, in fact, on the mother and her story. The wise doctor listens carefully to the mother's recountal of symptoms and pays due heed to it, as she is well qualified by her intimate knowledge of, and association with, her child to appreciate that it is in pain and to estimate its degree. The type of cry, the facial grimaces, movements of the legs and arms and even of the body give her a fairly accurate picture of abdominal pain. She may not be able to explain why she recognizes the presence of abdominal pain, but recognize it she does. In respect of the two, three or four year old child, the doctor can seek further evidence by questions, such as: "Did the child stop playing or doing something interesting or entertaining and complain of pain?" and "Did the child lie down of its own accord?" The object of such questions is to determine if the child really had pain, how long it lasted and how severe it was.

If the medical attendant is convinced that abdominal pain is present or has occurred, he should not dismiss it as of little importance until a complete clinical examination has been made. It is a fact that abdominal pain in children may be related to minor conditions, such as constipation of a not very serious degree, to the presence of worms, to a disordered peristalsis associated with unwise food ingestion and even to the "umbilical colic" of the nervous child. However, quite as commonly, it is due to appendicitis, to intussusception, to pyelitis and to other important pathological conditions. The conditions with more serious prognosis must be excluded before a diagnosis of one of the less important states is made.

The Attack of Acute Abdominal Pain.

In the infant, if the milder states of wind colic, hunger, and constipation and the presence of an inflammatory entero-colic condition are excluded, intussusception and other bowel obstructions due to congenital abnormalities such as hernia and volvulus must be included in the review. Intussusception occurs with sufficient frequency to be kept in mind constantly, and while the acute screaming attack associated with pallor is frequent, it is not constant. The condition may be heralded in by a more insidious syndrome of mild abdominal pain, vomiting and maintained malaise. As regards the infant, too, it is well to remember that an inflammatory appendicitis, while rare under the age of two years, does occur occasionally.

In the child, some pathological state of the vermiform appendix is the most important and the commonest cause of an attack of acute abdominal pain. The younger child may merely cover the abdomen with the hand and say "sore", while the older one, on being questioned, may point to the umbilicus or to the right lower abdominal quadrant and indicate that that is the seat of the pain. In both instances, tenderness in the right lower quadrant can be elicited. This should be approached cautiously and without undue questioning of the child. To ask a child "Is that sore?" or "Is it sore here?" may produce conflicting and confusing replies. If the doctor kneels down, lays the warm hand gently on the abdomen, moves it about slowly, indenting with the fingers at the cardinal areas, maintaining a conversation with the child quite unrelated to his pain and carefully watching the face for a grimace, listening for "that hurts!" or appreciating a squirm of the body or a thigh flexing, he will recognize the area of tenderness.

The elevated temperature, the furred tongue, and, very important, the fœtid breath will help in the diagnosis, but early in the attack of obstructive appendicitis, the temperature may not be elevated and the leucocytes may not be appreciably raised in number. It is well to remember that appendicitis due to obstruction by fæcolith or by kinking from adhesions is a common occurrence. And further, such a condition in a child tends to progress quickly in a few hours to swelling of the appendix, then thinning of part of the wall and perforation. Rectal examination should be performed when the diagnosis is in doubt, as in some instances right-sided tenderness will be found. However, great reliance cannot be placed on negative results, as this examination to most children is so abhorrent as to produce merely an unhappy and tearful result.

To discuss a differential diagnosis of the more rare serious conditions producing abdominal pain in childhood, torsion of an ovarian cyst, cholecystitis, Meckel's diverticulum producing obstruction or inflammation, or an obstructive lesion of the kidney is rather outside the scope of this paper, but the commoner conditions can be excluded by clinical examination.

Microscopic examination of the urine will exclude an attack of pyelitis, and pneumonia will be found by clinical examination of the chest. However, in doubtful cases an X-ray examination of the chest is wise, as this may reveal a small central patch of pneumonia. Acute tonsillitis or pharyngitis may be ushered in by pain in the abdomen and vomiting, and a careful examination of the throat with good light is essential. Infectious hepatitis does not produce tenderness in the right lower quadrant of the abdomen, but rather over the liver and upper quadrant. Rheumatic fever may be accompanied by abdominal pain, but it produces a generalized abdominal soreness rather than a localized tenderness, and the abdominal colic of a dietetic indiscretion is accompanied by violent vomiting and tenderness generally on the left side.

Acute non-specific mesenteric adenitis, accepted now as a clinical entity, can be confusing. In my experience it is not common and is a diagnosis which is made post-operatively. The syndrome so closely approximates that of an inflammatory appendicitis that operation can hardly be withheld.

Faced with a child suffering acute abdominal pain, the medical attendant must give appendicitis prior place in his differential diagnosis. If he is not convinced that appendicitis can be excluded, he should seek further advice, or if he is the "last port of call" and further advice is not obtainable, he is well advised to operate through a McBurney incision. I am of the opinion that following this plan, the conscientious doctor will make fewer errors of importance to his small patients than by following a policy of waiting and maintaining observation over periods of twenty-four, forty-eight or more hours.

The Child with Recurrent Abdominal Pain.

The problem of the child with recurrent abdominal pain faces the general practitioner daily. He is confronted with the child that has had attacks of mild abdominal pain over a period of many months. These attacks may or may not be associated with vomiting. Even the parents are confused and find difficulty in assessing the severity of the pain, and at times have related the complaint to a wish to avoid going to school or an attempt at refusing food. Repeated microscopic examinations of the urine have failed to reveal evidence of urinary infection, and the doctor may not at any time have seen the patient in an attack.

Questioning of the parents should elicit information along the following lines: "How long does an attack last?" "Does the child complain of the pain when engaged in play?" "Does he voluntarily lie down and rest?" "Have any of these attacks been associated with a sore throat or cold?" The object of these and similar questions is to establish the fact that the child does have attacks of pain in the abdomen occurring at intervals and that these attacks are not related to tonsillitis, or to any nervous or allergic phenomenon, and that each lasts long enough to suggest some organic cause.

If this fact is established, what other investigations are to be carried out to obtain more information? An opaque meal and a fluoroscopic examination when the meal has reached the ileo-caecal area may reveal that the appendix does not fill or does so unevenly, and this suggests the presence of a total or partial obstructive lesion of the appendix. It is suggestive only, and if such a result is obtained it cannot be overlooked. However, if the report

shows no such result, it is still possible for the appendix to be the cause of the recurring attacks of pain. The opaque meal and X-ray examination may reveal an abnormal position of the intestines and suggest a congenital abnormality of the intestines, but this is a very rare condition and the opaque medium never shows the presence of a Meckel's diverticulum.

It may be said of X-ray examination that while it may be slightly helpful in the diagnosis of a possible appendiceal origin of the pain, it is not an essential aid to diagnosis. The intravenous or intramuscular injection of a dye and uretero-renal excretion films may reveal the presence of hydronephrosis with either a calculus or a congenital obstruction of a ureter. But again, such cases are rare, and excretion urography is not advised as a general rule, unless there is some added clinical indication.

It would appear, then, that if the doctor is convinced that pain in the abdomen is occurring at intervals, that if causes such as worm infestation, allergy, pyelitis, recurrent tonsillitis, obstruction to urinary flow, epigastric hernia and the umbilical colic of the hyperexcitable child can be fairly adequately excluded, the appendix is the likely causative agent. Then laparotomy through a McBurney incision should be undertaken and appendicectomy performed. The presence of a Meckel's diverticulum can be excluded by search, and palpation will exclude an ovarian cyst in the older girl, and the rare case of cholecystitis.

Experience over many years and of many patients indicates that appendicectomy in these cases will generally produce relief from the recurring attacks of pain in the abdomen.

J. STEIGRAD,
Sydney.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

THE WEARING OF IRONS.[1]

Colonial Secretary's Office,
Sydney, April 10, 1833.

James Bowman, Esq.,
Inspector of Hospitals.

Sir,

With reference to your letter of the 6th instant, reporting that there are nine men belonging to the Emu Stockade in Windsor Hospital with slight sores on one leg, that prevent them wearing Irons on both, and suggesting that in order to obviate their evasion of punishment on that account, they should wear both their Irons on the one sound Limb, I am directed by His Excellency the Governor to acquaint you, that the Principal Superintendent of Convicts has been requested to cause your suggestion to be acted on, if he has no objection to urge against it.

I have, &c.,
T. C. HARRINGTON.

Correspondence.

CHILDREN AND ACCIDENTAL POISONING.

SIR: It is always a tragedy when we hear of the death of a child from such a readily preventible cause as accidental poisoning, and from my observations this is a hazard to which doctors' children are particularly liable. Whilst we have been forcibly reminded, in the British medical Press, of the lethal properties of ferrous sulphate and antihistamines to young children, most of us do not realize the danger from the familiar home remedies. If it were not for the special intuition that doctors' wives have, most of our children would have succumbed years ago—probably to a "sample" sent by post.

I hope that the following two cases, though not doctors' children, may cause some of us to have another look in accessible shelves, drawers and pockets. It may remind us to tell patients when handing over prescriptions that they should keep its contents well away from children.

CASE I.—A usually placid and well-behaved boy of two and a half years was brought up to the surgery at 8 p.m. one night, with the story that he had woken up early from his morning sleep, and had been babbling irrationally ever since. He had not eaten anything and showed no signs of going to sleep. The child was sitting fairly quietly, but kept up a ceaseless meaningless chatter for the hour he was under observation by me. The only abnormal physical signs were flushed cheeks and dilated pupils, and I thought he was unable to accommodate, but this may have been due to his exalted mood. There was no smell of alcohol and the diagnosis was almost certainly amphetamine or belladonna poisoning. The parents denied having any medicine in the house, especially "slimming tablets", indigestion powder or enuresis treatment for the other children. So the child was given heavy sedation with a rapidly acting barbiturate, and the parents took him home to have a further search. Very shortly afterwards they rang and said some visitors had given the child a tube of "Benzedrine" inhalant to play with, and later found the child holding it under water until it was full and then drinking the contents. Despite heavy dosage of "Nembutal" the child remained awake until 5 a.m., and then slept for an hour and a half only. Yet when seen shortly afterwards it was obvious that he was better, pupils being less dilated, and the child appeared to focus on near objects. He vomited all food during the day, and presented the sorry picture of a typical "hangover". By the following morning he was practically normal.

I had just finished discussing with the distributors of these inhalants some measures to prevent children getting a dose of 325 milligrammes of "Benzedrine", when the postman arrived. Needless to say, he presented me with a box containing a sample of two "Benzedrine" inhalers. They were not taken into my home.

CASE II.—One Saturday a pharmacist decided he would treat his three active boys for oxyuriasis and brought home a bottle of 100 coated tablets of gentian violet. Some hours later the youngest child, aged two, was discovered in the toilet with the bottle—now containing only 30 tablets. It was considered that if the child had eaten them he would have chewed some; however, there was no purple staining to be seen in his mouth. The water in the toilet was of normal colour, but one of the other boys had in the meantime used it. Salt and water, followed by mustard and water, produced a violent emesis, but six tablets only were recovered. Vomiting continued for some time afterwards, and no more tablets appeared, so it was considered that the child had eaten a few and emptied the rest into the toilet. A search of advertising brochures and text-books of toxicology all emphasized the importance of sticking to the exact dose for age and weight, but no information was found about antidotes or toxic symptoms. No further information was obtained by ringing the casualty surgeons at several leading metropolitan hospitals, so it was decided to wait and see. The child remained perfectly healthy, and next day passed with his stool a mass from which the father recovered the missing 70 tablets in a perfectly normal condition, and no threadworms were to be seen.

As a result of this I have given up using that type of gentian violet in view of its complete failure to dissolve in the eighteen hours or so it was in the alimentary tract.

Yours, etc.,

D. J. BRENNAN.
1 Miller Avenue,
Ashfield,
New South Wales.
May 16, 1952.

HUMAN BITE INFECTION.

SIR: An editorial in your issue of April 26, 1952, page 583, recalls two cases of unusual infection.

In 1901 a sailor exhibited three primary chancres on his left forearm; he said that some weeks earlier he had been bitten thrice by another sailor in a drunken brawl.

In 1916 a timid woman of middle age was referred to me with a provisional diagnosis of tuberculosis of the throat: I could find none. There appeared, however, mucous patches, whose nature was confirmed when coppery macules were found on her chest. Fortunately a vulval inspection was not

[1] From the original in the Mitchell Library, Sydney.

proposed, for a few yellow scales on a loop of hair hanging over her ear suggested raising this loop and so disclosed an *ulcus durum* on the lobe of the ear. Blushing furiously, she said that two months earlier the milkman, in playful gesture, had bitten her.

Yours, etc.,
GUY GRIFFITHS.

Sydney,
May 3, 1952.

THE INJURED COCCYX.

SIR: "Stedman's Practical Medical Dictionary" describes coccydinia as "severe pain in the region of the coccyx". This is most frequently found in the surgery after a fall astride or after a fall on the coccyx (missing the chair when sitting down *et cetera*). The patient is commonly seen several days after the mishap, when time has failed to ease the pain. From a limited number of cases encountered in general practice, I have concluded that this is frequently due to dislocation, and suggest that this is insufficiently stressed in our training. The usual treatment outlined is protection of the coccyx from pressure, the use of analgesics, and rest. Often the patient is cheerfully told that the condition will respond slowly, and this may mean several weeks. Later treatment may include injections of local anæsthetic agents, excision *et cetera*.

Ossification of the four parts of the coccyx extends from the second year to about the fortieth. Usually the segments unite, but the fusion of the first and second segments may be delayed until the thirtieth year.

An injury to the coccyx will probably produce a fracture, a dislocation, bruising, or a variable combination of these. Muscular traction pulls the bone forwards. This may exert pressure, through tilting, on the posterior primary ramus of the fifth sacral nerve. It is here suggested that dislocation commonly occurs with anterior movement of the second coccygeal segment from the first.

On August 14, 1948, Miss M.R., aged twenty-two years, complained of pain about the coccyx. On August 6 she had reached up to insert a new lamp in a socket, had overbalanced, and in falling had struck the protruding edge of a table. There were no marks visible on her, but pressure on the distal end of the coccyx evoked acute pain. She preferred standing to sitting. Since the injury she had passed a little bright red blood *per rectum*. At the time it seemed that she had fractured her coccyx; the blood was presumed to be due to trauma of the rectal wall. A rectal examination was performed, and an anterior protrusion of the coccyx was noted; more or less accidentally, the coccyx was gently forced backward, and the patient immediately noted an easing of her pain. More pressure was then applied until that surface of the coccyx palpable *per rectum* was made level. An extremely gratified patient then performed a full range of movement and sat down without pain. Next day she was reexamined, and had remained free of pain.

This experience suggested that routine examination of a patient with an injured coccyx should always include a rectal examination on the first occasion, and when possible, restoration of the normal curve of the coccyx. This may be obvious to many, but it is not done by many of my contemporaries. Often it has been possible in later cases to correct the displacement with the examining finger. Sometimes it had been necessary to pull the coccyx distally; at times this has been a bimanual manœuvre; on other occasions the insertion of the index finger into the rectum and the placing of the thumb on the anal cleft have allowed sufficient pressure to be exerted.

Of 17 patients followed up since such a procedure, 11 have had immediate and complete ease, and two have lost their pain over the ensuing seven days (it is suggested that the residual pain was due to contusion to bone, periosteum, soft tissues *et cetera*). Of the remaining four, one was given relief by a repetition of the procedure several days later; this patient was aged sixty-seven years. One patient was radiologically examined when the pain continued, and was shown to have a comminuted fracture; she received only slight benefit from subsequent operation. The final two discontinued their visits, although their pain remained, and they are believed to have sought other advice.

Now, while 17 is not a large number of cases from which to draw any conclusion, the dramatic improvement in 11 from what is often a very delayed recovery suggests that more cases of coccydinia are due to dislocation than many of us realize. If this letter prompts anyone to attempt a reduction *per rectum*, it will have served its purpose. It would be interesting to know whether other general practitioners get similar results, or whether this was just a fortunate unselected group of cases.

Yours, etc.,
PHILIP NOLAN.

Bothwell,
Tasmania,
April 15, 1952.

BAROTRAUMA.

SIR: Though the incidence of barotrauma amongst airline passengers is uncertain, the large number of people travelling by air makes it likely that the absolute number of sufferers will not be small, and consequently doctors who have had no experience in aviation are probably consulted by people with this trouble from time to time. Dr. N. E. Box's summary in the journal of April 19 of the clinical aspects of barotrauma is therefore most useful.

It is to be regretted that limitations of time and space did not permit Dr. Box to go on to discuss more fully the ætiology of the syndrome, especially since the work of Aschan has thrown doubt on the adequacy of the purely mechanical causation which has been generally accepted. In animal experimentation Aschan showed that the development of histological changes in the mucosa of the middle ear and paranasal sinuses was related to reduced or increased oxygen partial pressure and not to changes in total barometric pressure.

It is current airline practice to limit the rate of change of cabin altitude, either in climb or descent, to about 300 feet per minute. It is hard to locate the origin of this practice, which, certainly in the case of climb, is unsupported by physiological evidence. As regards descent it is doubtful whether rates of change of cabin pressure, up to the maximum permitted by the operating limits of aircraft at present in use here, would cause any greater incidence of barotrauma. These restrictions on rates of ascent and descent are at present rather a nuisance operationally and will become considerably more so with the advent of turbine-powered passenger aircraft.

On the other hand, incidence of barotrauma in airline passengers might well depend on the rate of change in pressure, as well as on the total change in cabin pressure, if the rate of change were varied over a wide range. There seems to be no evidence at present available from which one could construct tolerance curves relating these two variables for such criteria as just noticeable sensation, threshold of discomfort or occurrence of barotrauma.

This would be a useful subject for study by a physiologist with access to a decompression chamber. Certainly it would be of considerable practical value to the manufacturers of cabin pressure control equipment and to the aviation industry generally.

Yours, etc.,
JOHN LANE.

499 Little Collins Street,
Melbourne, C.1,
Victoria.
May 16, 1952.

Reference.

Aschan, G. K. (1948), "Aero-otitis Media and Aerosinusitis". *Acta Oto-laryngologica*, Supplementum LXIX.

THE ANTIBODY TITRE IN MATERNAL AND INFANT'S SERUM AS AN INDICATION FOR TREATMENT IN HÆMOLYTIC DISEASE OF THE NEWBORN.

SIR: We can hardly allow Dr. J. Grantley Shelton's remarks in the correspondence columns of THE MEDICAL JOURNAL OF AUSTRALIA of April 19, 1952, to pass unchallenged.

In the first place we drew our conclusions from the 43 consecutive cases listed in the experimental series, and not from the 20 cases of Group III as he states. Although the number of cases quoted is only 43, our conclusions are based upon a background of several hundred cases observed, studied and treated over the last nine years. Since our article was written, we have studied a further 64 cases, and these have fully substantiated our claims.

Dr. Shelton apparently does not appreciate the fact that most of our cases have been referred to us by the honorary

obstetricians of this hospital, every one of whom has referred at least one case to us for our opinion and help. We therefore have a large body of critical observers who would have been the first to point out to us that our statements had been incorrect or misleading, had they been of that opinion. We would indeed have been foolish to publish results which could have been refuted, had they been incorrect, by the individual obstetricians responsible for the cases. On the contrary, the honoraries have accepted our prognosis and have acted upon the advice given—I think to the satisfaction not only of themselves, but also of the parents concerned.

We feel surprised that Dr. Shelton has had the temerity even to question our claims. He has condemned us without trial, as it is obvious that he could never have performed standardized antiglobulin tests as described in our article, upon a sufficient number of cases in the time between the publication of the article and the appearance of his letter in the journal, to form any conclusions as to the accuracy of our remarks. Indeed, from the statements appearing in the lay Press within the last three months, it is doubtful if, at the time of writing his letter, he had been concerned with more than a handful of cases, as we were informed in the local papers that "exchange transfusion had for the first time been performed at the Women's Hospital, Melbourne, upon eight cases, five of which had been completely successful and had been allowed to go home".

If Dr. Shelton would care to come to our laboratory, we would be only too pleased to entertain him and show him all we can. Failing this, under certain conditions, we would be prepared to accept blood samples by air mail and attempt a prognosis for him.

Yours, etc.,
G. A. KELSALL.
G. H. VOS.

Subiaco,
Western Australia,
May 7, 1952.

SIR: I would like to express my appreciation of the article by Dr. G. A. Kelsall and Dr. G. H. Vos ("The Antibody Titre in Maternal and Infant's Serum as an Indication for Treatment in Hæmolytic Disease of the Newborn", THE MEDICAL JOURNAL OF AUSTRALIA, March 15, 1952).

Dr. Kelsall and Dr. Vos have demonstrated yet another means of determining the degree of severity of disease in an affected infant. May I point out, however, that the test which they employ—difference of anti-Rh antibody titre in maternal and infant's cord serum—is time-consuming, and on this account is of prognostic value rather than therapeutic, because exchange transfusion should be commenced as early as possible from the birth of the baby.

In a recent criticism (THE MEDICAL JOURNAL OF AUSTRALIA, April 19, 1952) Dr. J. G. Shelton has quoted passages of the article by Kelsall and Vos and has made this statement: "I believe that the above statements of Dr. Kelsall and Dr. Vos are incorrect, are based on inconclusive evidence and are misleading to medical practitioners who are readers of THE MEDICAL JOURNAL OF AUSTRALIA."

I do not agree. I have recently analysed 70 cases of exchange transfusion which I have personally performed, and I cannot too strongly endorse the opinions that Dr. Kelsall and Dr. Vos have expressed in the management of these cases. The advice they have given is sound and well expressed.

Dr. Shelton in his criticism made this statement: "It is questionable whether early induction of labour is ever justifiable in these immunized mothers. The baby who will 'be stillborn if allowed to go to term' will always die soon after birth if induced at thirty-six to thirty-eight weeks despite drastic action."

May I submit the following case history:

Mrs. L.P., blood group O Rh-negative, gave a history that she had had four children, of which the last had been jaundiced and had been transfused six times. On January 31, 1950, her serum had agglutinating antibodies (anti-D) 1:64, anti-Rh blocking antibodies (anti-D) titre 1:256. On March 1 her serum had anti-Rh agglutinating antibodies (anti-D) titre 1:64, blocking antibodies (anti-D) titre 1:1024. The estimated date of confinement was March 30. In view of the high Rh antibody titre, labour was artificially induced on March 3. The baby weighed five pounds eight ounces. The cord hæmoglobin was 80% (12 grammes *per centum*). The Coombs (direct) test was positive, the baby typed as A Rh-negative at birth. The baby was given an exchange transfusion, using A Rh-negative blood. Five hundred and ninety millilitres of blood were injected, 533 millilitres of blood were withdrawn. Progress was uneventful.

On April 10, 1951, she again reported to the ante-natal clinic towards the end of her sixth pregnancy. She had not attended the ante-natal clinic during this pregnancy and had refused to be admitted for an artificial induction of labour. On April 12 her serum had anti-Rh agglutinating antibodies (anti-D) titre 1:16, blocking antibodies (anti-D) 1:512. On April 13 she was delivered of a female infant weighing six pounds thirteen and a half ounces. The cord hæmoglobin was 30% (4·5 grains *per centum*). The baby typed as A Rh-positive. The Coombs test was positive. The infant did not cry for some time after birth and later cried feebly. The liver was four fingers' breadth below the right costal margin and the spleen two and a half fingers' breadth. There were petechial hæmorrhages on the abdomen. Œdema was not present. An exchange transfusion was attempted, but the infant died when 320 millilitres of blood had been injected and 306 millilitres withdrawn.

It is reasonable to believe that the chances of survival of the first baby would not have been as good if delivery had occurred at term, and that the chances of the second would have been bettered by early induction.

I wish to thank the Superintendent of the Brisbane Women's Hospital (Dr. R. B. Salter) for permission to publish the notes from these case histories.

Yours, etc.,
J. C. A. DIQUE, M.B., B.S.,
Transfusion Officer, Brisbane and South Coast Hospitals Board.

Brisbane Hospital,
Brisbane,
May 8, 1952.

CASE OF CARBON MONOXIDE POISONING TREATED BY REPLACEMENT BLOOD TRANSFUSION.

SIR: Let us not obscure the fact that replacement blood transfusion in carbon monoxide poisoning is the point in question. The case was not written up as a treatise on the practical points in performing such.

What matter if the polythene tubing were inserted into the radial artery rather than into the inferior *vena cava*—the former was chosen in this case: (*a*) because it was easier to perform and (*b*) because the patient was elderly and intravascular manipulations in the radial artery would be much less likely to result in thrombosis and embolism than similar onslaughts on the inferior *vena cava*.

At no stage did I suggest that catheterization of the artery was the perfect or only way of carrying out the procedure.

As a point of interest to all, the intravenous use of methylene blue has been conclusively shown to be valueless.

I concur fully with your correspondents' suggestion that this method of treatment be given fuller scope in the early treatment of severe cases of carbon monoxide poisoning.

Yours, etc.,
B. J. IRELAND.

Abermain,
New South Wales,
May 21, 1952.

University Intelligence.

JOHN IRVINE HUNTER MEMORIAL ORATION.

PROFESSOR W. E. LE GROS CLARK, D.Sc., M.A., F.R.C.S., F.R.S., has been invited to deliver the second John Irvine Hunter Memorial Oration on Friday, August 1, 1952, at 8 p.m. in the Wallace Lecture Theatre, Science Road, University of Sydney. The subject of his oration is "The Contribution of Anatomy to Problems of Sensory Discrimination". Professor Le Gros Clark, of the Department of Anatomy, Oxford, is one of the leading British anatomists and has himself contributed much to our knowledge of the subject on which he will speak. Admission is by ticket obtainable on application to the Sydney University Extension Board, or the Department of Anatomy, University of Sydney. Graduates and undergraduates interested are cordially invited.

Medical Practice.

THE USE OF ANTIBIOTICS.

THE Antibiotics Committee of the National Health and Medical Research Council has drawn up a table indicating the use of antibiotics in various diseases. It is published herewith at the request of the Director-General of Health, Commonwealth Department of Health, Canberra. Under the headings of the several antibiotic preparations the numbers 1, 2 and 3 refer to the preferences in order in which the drugs should be used, in other words which drug would be expected to provide most benefit in a particular illness.

No.	Disease.	Sulphonamides.	Penicillin.	Aureomycin.	Terramycin.	Chloramphenicol.	Streptomycin.	Remarks.
1	Hæmolytic streptococcus (group A) infections.	—	1	3	3	2	—	Resistance to antibiotics not a problem, therefore try penicillin first. Most cases will respond.
2	*Streptococcus viridans* (endocarditis) infections.	—	1	2	—	—	1	Combined therapy: penicillin in large doses *plus* streptomycin two grammes per day to a total of 20 grammes. (Adults.)
3	*Streptococcus fæcalis* (endocarditis) infections.	—	1	2	—	—	1	Combined therapy as for (2).
4	Pneumococcal infections.	—	1	2	2	2	—	Resistance to antibiotics not a problem; should respond to penicillin.
5	Meningococcal infections	1	1	2	—	—	—	Combined antibiotic and sulphonamide therapy.
6	Gonococcal infections	1	1	—	—	—	—	
7	Staphylococcal infections:							
	(*a*) In hospitals	—	2	1	1	1	2	Resistance to antibiotics is a great problem, especially in hospitals where sensitivity tests should always be carried out. In general practice penicillin will probably be effective, but if there is no response in 36 hours, other antibiotics should be tried. Sensitivity tests to be done if possible.
	(*b*) In general practice	—	1	2	2	2	2	
8	Brucellosis	See remarks.	—	2	2	1	2	Combined antibiotic and sulphonamide therapy.
9	Pertussis	—	—	2	2	1	—	
10	Typhoid fever	—	—	2	2	1	—	
11	Influenzal meningitis	See remarks.	—	2	—	1	1	Combined antibiotic and sulphonamide therapy.
12	Urinary tract infections (uncomplicated):							
	(*a*) *Escherichia coli*	See remarks.	—	1	1	1	2	Antibiotic resistance is a problem in this group. The occurrence of resistant strains follows no set pattern. In hospitals, sensitivity tests should always be done. In general practice, various antibiotics may be tried. Combinations of antibiotics and sulphonamides may be useful. Try sulphonamides alone first.
	(*b*) *Bacillus aerogenes*		—	2	1	1	2	
	(*c*) *Proteus vulgaris*		—	2	—	1	1	
	(*d*) *Pseudomonas pyocyanea*		—	2	1	—	1	
	(*e*) *Streptococcus fæcalis*		2	1	1	1	2	
13	Tuberculosis	—	—	—	—	—	1	Combined with PAS.
14	Chancroid	—	—	1	—	2	1	
15	Friedlander bacillus (pneumonia)	—	—	—	—	1	1	
16	Salmonella infections (gastroenteritis and bacteriæmia).	—	—	2	2	1	1	
17	Bacillary dysentery	1	—	2	2	2	2	
18	Plague	1	—	—	—	—	1	
19	Subacute bacterial endocarditis:							
	(*a*) *Streptococcus viridans* (see above).	—	1	2	—	—	1	Combined penicillin and streptomycin.
	(*b*) *Streptococcus fæcalis* (see above).	—	1	2	—	—	1	Combined penicillin and streptomycin.
	(*c*) *Hæmophilus influenzæ et cetera.*	See remarks.	—	2	—	2	1	Combined antibiotic and sulphonamide.
20	Acute bacterial endocarditis:							
	(*a*) Staphylococcal (as above)	—	—	—	—	—	—	Antibiotic resistance a problem.
	(*b*) Others (as for corresponding organisms above).	—	—	—	—	—	—	
21	Trachoma	—	—	1	—	—	—	
22	Surgical conditions of bowel (pre- and post-operative).	1	—	—	—	1	2	Combined antibiotic and sulphonamide.
23	Pulmonary conditions (pre- and post-operative).	—	1	1	1	2	2	Depends on the organism.
24	Typhus and other rickettsial diseases.	—	—	2	2	1	—	
25	Primary atypical pneumonia	—	—	1	1	1	—	
26	Psittacosis	—	—	1	2	—	—	
27	*Lymphogranuloma venereum*	—	2	1	1	1	3	
28	*Granuloma inguinale*	—	2	1	1	1	3	
29	Anthrax	—	1	2	2	—	—	
30	Syphilis	—	1	2	2	—	—	
31	Yaws	—	1	2	2	—	—	
32	Rat-bite fever:							
	(*a*) *Spirillum minus*	—	2	1	—	—	—	
	(*b*) *Streptobacillus moniliformis.*	—	—	—	—	—	1	
33	Tularæmia	—	—	1	1	—	1	
34	Gas gangrene	—	1	2	—	—	—	
35	Influenza	—	—	—	—	—	—	
36	Common cold	—	—	—	—	—	—	
37	Infectious mononucleosis	—	—	—	—	—	—	
38	Actinomycosis	See remarks.	1	—	—	—	—	Intensive penicillin with sulphadiazine.
39	Acute amœbic dysentery	—	—	1	1	—	—	
40	Leptospirosis (Weil's disease)	—	—	1	2	—	—	
41	Diphtheria (see remarks)	—	—	1	—	—	—	Antiserum essential.
42	*Herpes zoster*	—	—	1	—	2	—	
43	Tetanus (see remarks)	—	—	1	—	—	—	Antiserum essential.

NOTE.—(*a*) Whenever possible, sensitivity tests should be carried out and the appropriate antibiotic given. (*b*) While combinations of antibiotics may be useful as indicated above, penicillin which is bactericidal should not be given with aureomycin, terramycin or chloramphenicol, which are bacteriostatic and prevent the organism reaching the stage of development at which penicillin is effective. (*c*) The importance of the development of antibiotic-resistant strains of organisms, especially in hospitals, is stressed.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Clinical Meeting at Balmoral Naval Hospital.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a clinical meeting will be held at the Balmoral Naval Hospital on Tuesday, June 17, 1952, at 2 p.m., when Dr. John Loewenthal will speak on "The Surgery of Sepsis". Clinical cases will be shown at 4 p.m., after afternoon tea. All members of the medical profession are cordially invited to attend.

THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

PROGRAMME FOR JULY, 1952.

Classes for Candidates for Higher Degrees and Diplomas Part II.

Course on Renal Disorders.

A course on renal disorders, under the direction of Dr. Leslie Hurley, will be held at the Royal Melbourne Hospital at 2 p.m. on the following days: July 11, Dr. Leslie Hurley, "Albuminuria and Classification of Nephritis"; July 15, Dr. Leslie Hurley, "Acute Nephritis"; July 18, Dr. Leslie Hurley, "Subacute Nephritis and Nephrosis"; July 22, Dr. J. L. Frew, "Chronic Nephritis"; July 25, Dr. J. L. Frew, "Essential Hypertension"; July 29, Dr. J. L. Frew, "Uræmia and Renal Failure".

The fee for this course is £3 3s., or 10s. 6d. per demonstration. Enrolments for attendance should be made with the Secretary of the Post-Graduate Committee.

Course on Gastro-Intestinal Disorders.

The course on gastro-intestinal disorders will continue on July 1, 4 and 8 at 2 p.m. at the Royal Melbourne Hospital, Children's Hospital and Royal Melbourne Hospital respectively. The fee is 10s. 6d. per demonstration.

Course for D.O., Part II, and D.L.O., Part II.

Intending candidates for D.O., Part II, and D.L.O., Part II, are requested to communicate with the Post-Graduate Committee as soon as possible, as the appropriate two courses, which would probably commence in July, will be held only if there is sufficient demand.

Course for D.D.R., Part II.

It has been decided to hold a course for D.D.R., Part II, commencing about the middle of July, 1952. This course will involve a series of lectures and demonstrations in radiodiagnosis, and also a short course in special pathology. Intending candidates are asked to communicate with the Post-Graduate Committee as soon as possible.

GYNÆCOLOGY AND OBSTETRICS REFRESHER COURSE.

A gynæcology and obstetrics refresher course will be conducted at the Women's Hospital, Carlton, from September 1 to 12, 1952. This course consists of daily ward rounds conducted in groups, where the routine work of the hospital will be demonstrated and taught, and of a series of demonstrations. Full details of the programme will be available within the next few weeks.

Fees for tuition, payable to the Post-Graduate Committee, are £10 10s. Fees for residence, payable to the hospital, are £7 7s.

ENROLMENTS.

Enrolments for all metropolitan courses should be made as early as possible with the Secretary of the Post-Graduate Committee, 394 Albert Street, East Melbourne. Telephone: JM 1547.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MAY 10, 1952.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	..	..	..	..	..	..	..	..	..
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	..	..	..	..	..	..	..
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	1	..	..	2(2)	..	..	..	4
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	..	..	3(2)	..	..	..	1	..	4
Diphtheria	9(3)	6(2)	7(4)	1(1)	..	..	..	..	23
Dysentery (Bacillary)	..	1(1)	6(6)	1(1)	2	..	..	1	11
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	..	..	..	..	14(2)	..	..	..	14
Lead Poisoning	..	..	..	..	..	..	..	..	..
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	1(1)	..	..	..	..	..	1
Malaria	..	1(1)	..	..	..	..	..	..	1
Meningococcal Infection	1	3(2)	1	1(1)	..	..	..	..	6
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	6(2)	3(1)	1(1)	15(14)	..	1	..	..	26
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	4(3)	..	..	..	..	..	2	6
Salmonella Infection	..	2(2)	..	..	3(3)	..	..	2	7
Scarlet Fever	26(9)	47(25)	1(1)	4(3)	3(3)	1	..	..	82
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	1	..	2	..	..	..	3
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	19(15)	29(22)	8(4)	5(5)	11(8)	5(3)	..	1	78
Typhoid Fever	1	..	..	..	1(1)	..	..	..	2
Typhus (Flea-, Mite- and Tick-borne)	..	..	2(1)	..	1(1)	..	..	..	3
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Corrigendum.

IN the issue of May 24, 1952, at page 716, an error has occurred in the paper entitled "The Rh Factor", by Dr. E. Beatrix Durie. (This article is one of the series of "Special Articles for the Clinician".) In the second paragraph of the first column, the two last sentences should read as follows: "One of the most useful of all is the Medical Research Council Memorandum Number 19, 'The Rh Blood Groups and Their Clinical Effects', by P. L. Mollison, A. E. Mourant and R. R. Race (1948), a new edition of which has just appeared. In addition, a new book by P. L. Mollison (1952) entitled 'Blood Transfusion in Clinical Medicine' has just been published."

Also on page 719, in the reference to the paper by P. L. Mollison and Marie Cutbush (1951), the word "Security" (second line) should read "Severity".

We regret that these mistakes have occurred.

Obituary.

HAROLD VERNON FOXTON.

DR. E. S. MEYERS has forwarded the following appreciation of the late Dr. Harold Vernon Foxton.

I should like to add a few words to the obituary notice of Dr. H. V. Foxton, as told by Dr. Basil Hart.

It was my good fortune to be Honorary Secretary of the Queensland Branch of the British Medical Association during the presidency of Dr. E. Sandford Jackson, Dr. H. V. Foxton and Dr. Eustace Russell. All these men, who have now passed on, were excellent presidents, and the profession in Queensland owes much to their wise leadership.

Dr. Foxton, as Dr. Hart has said, was a quiet man, but it was not very long before I realized that he had an excellent knowledge of the affairs of the British Medical Association and was never frightened to express his opinion on many matters, and to take a firm stand whenever it was required. It was a great pleasure to accompany him in the *Irex* on the River and in Moreton Bay, and his stories of the people he knew well were always full of interest. Naturally, he was most interested in the sailing men, and particularly those who were members of the medical profession. Unfortunately, the strenuous times through which we have all passed made these boating occasions all too rare for me. We need at the present time many more practitioners of the type of H. V. Foxton.

WILLIAM ALLEN HUNTER.

WE regret to announce the death of Dr. William Allen Hunter, which occurred on May 20, 1952, at Adelaide.

Medical Appointments.

Dr. J. J. Searby, Dr. F. J. Kenny and Dr. M. H. Slonim have been appointed public vaccinators for the Shire of Warracknabeal, Victoria.

Dr. George Edward Wardell Streeton has been appointed medical officer on probation at the Mental Hospital, Toowoomba, under the provisions of *The Public Services Acts*, 1922 to 1950, Queensland.

Dr. Eluned Myfanwy Puleston-Jones has been appointed Deputy Director, Division of Maternal and Baby Welfare, Department of Public Health, New South Wales.

Dr. Alfred Dudley Byrne has been appointed Honorary Gynæcologist to the Sterility Clinic at the Royal Adelaide Hospital.

Dr. B. G. Burton-Bradley has been appointed medical officer at the Brisbane Mental Hospital, Goodna, Queensland.

The following have been appointed, under the provisions of the *Cancer Institute Act*, 1948, members of the Cancer Institute Board, Victoria: Dr. John O'Sullivan, Professor P. MacCallum, Professor R. D. Wright, Sir John Newman-Morris, Dr. D. J. Thomas, Dr. Leo Doyle, Dr. G. G. Godfrey, Dr. S. G. L. Catchlove.

Dr. L. Bonnin has been appointed assistant medical superintendent (Surgical Branch) at the Royal Adelaide Hospital.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Wilson, Keith John, M.B., B.S., 1952 (Univ. Adelaide), 8 Chloride Street, Broken Hill.

Diary for the Month.

JUNE 6.—Queensland Branch, B.M.A.: Branch Meeting (Bancroft Oration).
JUNE 10.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
JUNE 13.—Queensland Branch, B.M.A.: Council Meeting.
JUNE 16.—Victorian Branch, B.M.A.: Finance Subcommittee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch **(Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.**

Victorian Branch **(Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.**

Queensland Branch **(Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.**

South Australian Branch **(Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.**

Western Australian Branch **(Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.**

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MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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